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(71) Applicant (for all d	esignated States except US): GEITED [GB/GB]; Sycamore Studie	NOSTI	Published Without international search report and to be republished

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road, Over, Cambridge CB4 5PJ (GB).

(57) Abstract

People vary enormously in their response to disease and also in their response to therapeutic interventions aimed at ameliorating the disease process and progression. However, the provision of medical care and medical management is centered around observations and protocols developed in clinical trials on groups or cohorts of patients. This group data is used to derive a standardised method of treatment which is subsequently applied on an individual basis. There is considerable evidence that a significant factor underlying the individual variability in response to disease, therapy and prognosis lies in a person's genetic make-up. There have been numerous examples relating that polymorphisms within a given gene can alter the functionality of the protein encoded by that gene thus leading to a variable physiological response. In order to bring about the integration of genomics into medical practice and enable design and building of a technology platform which will enable the everyday practice of molecular medicine a way must be invented for the DNA sequence data to be aligned with the identification of genes central to the induction, development, progression and outcome of disease or physiological states of interest. According to the invention, the number of genes and their configurations (mutations and polymorphisms) needed to be identified in order to provide critical clinical information concerning individual prognosis is considerably less than the 100,000 thought to comprise the human genome. The identification of the identity of the core group of genes enables the invention of a design for genetic profiling technologies which comprises of the identification of the core group of genes and their sequence variants required to provide a broad base of clinical prognostic information - 'genostics'. The 'GenosticTM' profiling of patients and persons will radically enhance the ability of clinicians, healthcare professionals and other parties to plan and manage healthcare provision and the targeting of appropriate healthcare resources to those deemed most in need. The use of our invention could also lead to a host of new applications for such profiling technologies, such as identification of persons with particular work or environment related risk, selection of applicants for employment, training or specific opportunities or for the enhancing the planning and organisation of health services, education services and social services.

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PROBES USED FOR GENETIC FILING

People vary enormously in their response to disease and the also in their response to therapeutic interventions aimed at ameliorating the disease process and progression. However, the provision of medical care and medical management is centered around observations and protocols developed in clinical trials on groups or cohorts of patients. This group data is used to derive a standardised method of treatment which is subsequently applied on an individual basis (e.g. the comment that drugs are often prescribed on the basis that everyone is a 70kg white male).

It is standard practice for clinicians to prescribe the same starting dose of a particular drug for a given indication and then adjust the treatment regimen by monitoring the progress of the disease and therapeutic response in individual patients. Observation of actual therapeutic outcome following these adjustments to patient's therapy provides the basis for determining a prognosis for the disease and developing a clinical management plan for patient care (e.g. see Fig 1, algorithm for management of schizophrenia, from Fig 1 Taylor and Kerwin 1997, Fig 2 algorithm for treatment of depression from Fig 1 Pathare and Paton 1997) and treatment algorithms published by the National Cancer Institute).

The standard practice of clinical management has its disadvantages. In particular it is retro-active in that changes to patient management will occur following the emergence of therapeutic failures, adverse events or other difficulties in undertaking the therapeutic regime (Lazarou et al 1998).

There is considerable evidence that a significant factor underlying this individual variability in response to disease, therapy and prognosis lies in a person's genetic make-up. There have been numerous examples relating that polymorphisms within a given gene can alter the functionality of the protein encoded by that gene thus leading to a variable physiological response (see Marshall 1997a and b for reviews).

Gene sequence variations that are present at a frequency of less than 1% in the population are arbitrarily designated as mutations whilst those at a higher frequency are known as polymorphisms (Schafer and Hawkins 1998).

DNA variants leading to monogenic diseases (e.g. presentilin mutations causing Alzheimer's disease, BRCA mutations causing breast cancer) are usually rare in a population due to the process of natural selection. However, variants of genes involved in, or contributing to, polygenic diseases do not act alone to produce the phenotype. As such selection against them occurs only when they are in the appropriate condition to cause the disease, as a result of this differential selection pressure they the individual variants can exist at quite high frequencies within a population.

Alteration of a single gene may not by itself be detrimental, but in combination with certain variants of other genes, may contribute to a disease phenotype (e.g. el-Zein et al, 1997, observed that the inheritance of a particular combination of metabolising

genes is strongly associated with lung cancer). The interaction of the relevant variant genes may be enough to cause a disease phenotype or spectrum of phenotypes, but in many cases other kinds of factors will also influence the course of events (e.g. interaction of ApoE genotype and head injury in Alzheimer's disease Nicholl et al 1996).

The identification of modifier genes that influence the penetrance and expressivity of these risk alleles will be key variables in assessing individual risk profiles. It is likely that the combination of and interaction between small discrete genetic influences on a disease state represent the single largest explanation for the phenotypic variation seen in medicine.

This opens the possibility that the identification of the genes associated with disease and an understanding of how these genes interact with the environment, can lead to better prediction of the outcome of both the disease and the therapeutic process. This in turn would allow the tailoring of resources and therapy to meet the likely requirements of the individual patient (Marshall 1997a). The net result should be improved clinical management, identification of the potential for prevention, the reduction of the burden of disability and, ultimately, improved quality of life for the individual (Poste 1998).

As a result of the appreciation of the contribution of genetic variation to medicine, considerable effort has been made to determine how individual genetic variations affect overall health (including predisposition to disease) and once disease is manifest, the likely patterns of progression, responsiveness to treatment and overall prognosis.

In a quest to understand and plot the limits of genetic variation in humans the Human Genome Project was launched in 1990 with a mission to sequence the code of all 100,000 or so human genes by 2002.

As a result of the Human Genome project not only is the mapping and sequencing of the human genome becoming well understood but also the degree of variability in gene sequence between individuals is being documented (Lander 1996). The average difference between individuals appears to be around 0.3% which equates roughly to a difference in one base pair every 500-1000 base pairs of sequence. The variations are known as polymorphisms and such polymorphic variation is thought underlie much of the clinical variability observed in patients with disease and in their response to therapy.

The resultant explosion of genetic sequence information has lead to the emerging sciences of genomics and proteomics. Within the disciplines technologies have evolved (e.g. polymerase chain reaction, single strand conformational polymorphism etc) which allow us to read individual sequence data and detect and identify polymorphic variation in individuals, in disease states and in different ethnic groups (Griffin et al 1997, Little et al 1997).

As a result of such studies individual genes have been identified which indicate a

predisposition to disease or a susceptibility to adverse drug responses (e.g. presenilin gene mutations and development of Alzheimer's disease, BRCA gene mutation and development of breast cancer, ACE polymorphisms and early onset heart disease, cytochrome P450 polymorphisms and drug metabolism).

However, such studies have been completed as academic exercises in scientific discovery and involve individual genes and large groups of patients.

Usually a particular individual response to disease or therapy is likely to result from a complex interaction between multiple genes, discrete environmental factors and the particular therapeutic approach offered (for example see algorithms in Figs. 1 and 2).

As a result, despite the many publications concerning the theoretical or potential applications of genomics to medicine (e.g. Marshall 1997a and b, Poste 1998, Crooke 1998), progress in implementing these approaches on a practical level has been exceedingly slow. In particular, little progress has been made in the understanding of or the ability to prognose individual response to particular disease states or therapeutic regimes (Poste 1998).

In part this has been related to the types of technology available for such studies (Marshall and Hodgson 1998). Such techniques as MALDI-TOF (Griffin et al 1997), sequencing (Dramanac et al 1998) and molecular beacons (Tyagi et al 1998) are complex and relatively slow and require the availability of specialised laboratories and highly trained personnel.

In recent reviews of the field it has been stated that:

- 'within next 10 years when not only all genes (will have been) identified but all common intragenic variation also' (Lander 1996).
- the 'assembly of comprehensive clinical databanks and their use for large-scale genetic association studies to define robust disease-gene risk correlations' constitutes a significant technological challenge (Poste 1998).
- 'if all human DNA variants were known this set would include all functional
 polymorphisms and if they could be analysed in all individuals comparison of
 phenotypes and correlation with genotype might make possible the assignment of
 function to every gene that predisposes to disease of any kind, and also to nonclinical phenotypes including behavioural traits. The sheer task of this is
 overwhelming and may never be practical' (Shafer and Hawkins 1998).

On the basis of the current state of the art it seems clear that translating the colossal investment in the human genome project into a means of revolutionising healthcare management requires both substantial creativity in the harnessing of technologies and considerable technical invention before its promise of can be realised.

For the realisation of the promised revolution in medicine two key factors require consideration;

- The human genome is made up of some 100,000 separate genes.
- Not all genes are of equal biological importance as regards the physiological functioning of humans.

The first issue, that of reading and tracking the volume of information encapsulated in the human genome by the sequence of 100,000 genes and their mutations and polymorphic variations, is beginning to be addressed by emergent technologies such as DNAchips, MALDI-TOF MS (Marshall and Hodgson 1998 see Table 1) and PEDIAT-type technologies (Fox 1998).

Table 1. The main features of some hybridization array formats currently available (Marshall & Hodgson 1998)

Company	Arraying method	Hybridization step	Readout	Main focus
Affymetrix (Santa Clara, CA)	On-chip photolithographic synthesis of -20-25-mer oligos onto silicon wafers, which are diced in 1.24 cm ² or 5.25 cm ² chips	10,000-260,000 oligo features probed with labelled 30-40 nucleotide fragments of sample cDNA or antisense RNA	Fluorescence	Expression profiling, polymorphism analysis, and diagnosis
Brax (Cambridge, UK)	Short synthetic oligo, synthesized off chip	1,000 oligos on a "universal chip" probed with tagged nucleic acids	Mass spectrometry	Diagnostics, expression profiling, novel gene identification
Hyseq (Sunnyvale, CA)	500-2000 nt DNA samples printed onto 0.6 cm ² (HyGnostics) or ~18 cm ² (Gene Discovery) membranes	64 sample cDNA spots probed with 8,000 7-mer oligos (HyGnostics) or ≤55,000 sample cDNA spots probed with 300 7-mer oligos (Gene Discovery)	Radioisotope	Expression profiling, novel gene identification, and large-scale sequencing (Gene Discovery array), polymorphism analysis and diagnostics (HyGnostics/HyChip arrays), and large-sample sequencing (HyChip array)
	Prefabricated 5-mer oligos printed as 1.15 cm ² arrays onto glass (HyChip)	Universal 1024 oligo spots probed 10 kb sample cDNAs, labelled 5-mer oligos and ligase	Fluorescence	
Incyte Pharmaceuticals (Palo Alto, CA)	Piezoelectric printing for spotting PCR fragments and on-chip synthesis of oligos	≤ (eventually 10,000) oligo/PCR fragment spots probed with labelled RNA	Fluorescence and Radioisotope	Expression profiling Polymorphism analysis, Diagnostics
Molecular Dynamics (Sunnyvale, CA)	500-5000 nt cDNAs printed by pen onto ~10 cm ² on glass slide	~10,000 cDNA spots probed with 200-400 nt labelled sample cDNAs	Fluorescence	Expression profiling and novel gene identification
Nanogen (San Diego, CA)	Prefabricated ~20 mer oligos, captured onto electroactive spots on silicon wafer, which are diced. Into ≤ 1 cm ² chips	25, 64, 100, 400 (and eventually 10,000) oligo spots polarized to enhance hybridization to 200-400 nt labelled sample cDNAs	Fluorescence	Diagnostics and short tandem repeat identification
Protogene Laboratories (Palo Alto, CA)	On-chip synthesis of 40-50-mer oligos onto 9 cm ² glass chip via printing to a surface- tension array	≤8,000 oligo spots probed with 200-400 nt labelled sample nucleic acids	Fluorescence	Expression profiling, and polymorphism analysis
Sequenom (Hamburg, Germany and San Diego, CA)	Off-set printing of array, around 20-25-mer	250 locations per SpectroChip interrogated by laser desorbtion and mass spectrometry	Mass spectrometry	Novel gene identification, candidate gene validation, diagnostics, and mapping
Synteni (Fremont, CA)	500-5000 nt cDNAs printed by tip onto ~4	≤10,000 cDNA spots probed with 200-400 nt labelled sample	Fluorescence	Expression profiling and novel gene identification

	cm ² glass chip	cDNAs		
The German Cancer Institute (Heidelberg, Germany)	Prototypic DNA macrochip with on-chip synthesis of probes using f-moc or t-boc chemistry	Around 1000 spots on a 8x12 cm chip	Fluorescence/ mass spectrometry	Expression profiling and diagnostics

These new technologies mark a significant advance in the potential application of genomic information to the problems of biology and human health. The reason for this is their capability of determining or confirming a large volume of DNA sequence data very quickly at the individual level. In this way they open the door to the application of genomic information to the individual patient.

These technologies are also evolving quickly according to Moore's Law (which posits that computer chips' power doubles every 18 months). For instance, three years ago the genechips made by leading companies held some 20,000 DNA probes. Currently genechips with 65,000 probes are available, and a chip with 400,000 probes has recently been produced (Marshall and Hodgson 1998). Applications for such technologies have included sequencing, diagnostics (mutation detection in the BRCA1 gene for cancer), gene discovery, gene expression profiling and gene mapping (Marshall and Hodgson 1998).

However despite their value as research and diagnostic tools, the genechips in existence are utilized largely as research tools (Marshall and Hodgson 1998). They have not been used as a tool for the express purpose of improving healthcare management by enabling the process of clinical prognosis and facilitating the generation of health risk profiles.

The reason for this is the failure to conceive of or invent an appropriate design which identifies the critical core of genes which are the most important in terms of human function. The genetic variability in this group of genes is the most important contributor to the variation in clinical and physiological phenotypes. Not all genes are equally important in the normal physiological functioning of the human body nor in the induction, development or progression of diseases or physiological states. In a given disease, as few as 5-10 genes in different configurations may be of seminal importance in determining the vast bulk of inter-individual variability to disease and therapeutic approaches (Drews 1997, Goodman and Gillman 1996).

As such, a device capable of delivering information on 10,000 genes may leave its user in grave danger of information overload and render him/her unable to identify and abstract the critical information required to enhance patient management or healthcare.

As a result, the translation of such technologies in genechip devices from research tools into healthcare management tools is severely limited (Marshall and Hodgson 1998, Poste 1998, Schafer and Hawkins 1997).

In an effort to overcome this difficulty a consortium of academic and industrial groups

(SNP Consortium) has been formed to try and identify the important disease related variants of human genes. The technologies to be used are the generation and assembly of a SNP map spanning the whole human genome and its application to linkage studies.

However, this approach is still in its infancy and is widely held to face considerable technical hurdles in the robust statistical analysis of huge datasets.

In order to bring about the integration of genomics into medical practice and enable design and building of a technology platform which will enable the everyday practice of molecular medicine a way must be invented for the DNA sequence data to be aligned with the identification of genes central to the induction, development, progression and outcome of disease or physiological states of interest:

Practitioners of molecular healthcare need to be able to;

- Identify the presence or absence of a selected group of genes and polymorphic variants central to the induction, development progression and outcome of disease or physiological states
- Focus on polymorphisms that lie within the coding or regulatory regions of the gene and are likely to result in altered structure or expression of the protein.
- Utilise the data on the core group of genes in order to generate guidelines and guidance for the healthcare management of patients or persons.

The invention described herein identifies the core group of genes required for the design development and manufacture of such a valuable aid to clinical management of the patient and general healthcare management.

According to the invention, the number of genes and their configurations (mutations and polymorphisms) needed to be identified in order to provide critical clinical information concerning individual prognosis is considerably less than the 100,000 thought to comprise the human genome.

The identification of the identity of the core group of genes enables the invention of a design for genetic profiling technologies which comprises of the identification of the core group of genes and their sequence variants required to provide a broad base of clinical prognostic information - 'genostics'.

By careful and lengthy research of the literature, tabulation of data, cross referencing of studies and conduction of a variety of experiments we have identified the core group of genes, which, if assessed for the presence of their functional variants, will enable an enhanced prognosis for an individual patient and form the basis for converting genetic profiling technologies from research tools into universal tools for health management.

Identification of the core group of genes and their functional variants also allows for said technologies to be utilised in generating individual health-risk profiles and profiling the health-risks of the population at large. The determination and

identification of sequence data required to identify the important functional variants is readily accomplished by those skilled in the practice of the relevant arts.

The invention does not provide a method for treatment <u>as such</u>. Nor does it provide a direct method of diagnosis of illness or health risk <u>as such</u>. Information obtainable using the invention can be used by a medical practitioner to tailor resources and therapy to meet the likely requirements of individual patients and selected populations of patients. For example in a complex regime or clinical management plan (as seen for example in Fig. 1 and 2) the invention allows the better prediction of the outcome of both the disease and the chosen therapeutic process.

The enablement of the invention and the generation of the information required for the design of 'genostics' requires:

- 1. Identification of sequence data (Example 1).
- 2. Assessment of the type and significance of sequence variation in the core group of genes (Examples 2,3,4).
- 3. Identification of likely genetic variation/disease relationships (Example 5 and 5a).
- 4. Means of identifying and detecting additional polymorphisms in the core group of genes (Example 6).
- 5. A practical approach to data analysis to generate information on prognosis(Example 7).
- 6. An illustration of how clinical management of a patient can be enhanced by utilising genetic profiling approaches (Example 8 and 9).

EXAMPLE 1

Gene sequence data is readily available in the public domain.

For the design of the GENOSTIC genechip device, gene sequence data can be retrieved, by persons skilled in the art, by searching the following public databases:

Website	Address	Description
DbEST	http://www.ncbi.nlm.nih.gov/dbES T	Database of expressed sequence tags
EBI/EMBL	http://www.ebi.ac.uk/mutations/	Mutations
EBI: The European Bioinformatics Institute, Hinxton, UK	http://www.ebi.ac.uk/ebi_home.html	Nucleotide Sequence Database
EMBL	http://www.ebi.ac.uk/queries/queries.html	Nucleotide Sequence Database
GDB: The Genome Database, Infobiogen European Node, FRANCE	http://www.gdb.org/gdb/gdbtop.htm	Human Genome Database

GeneCards	http://bioinformatics.weizmann.ac.il	GeneCards is a database of
Genecarus	/cards/index.html	
	/ourds/index.html	human genes, their products and their involvement in
ConcClinica	heter//server association /	diseases.
GeneClinics	http://www.geneclinics.org/	GeneClinics (formerly
		Genline) is a knowledge base
		of expert-authored, up-to-date
		information relating genetic
		testing to the diagnosis,
	•	management, and counseling
		of individuals and families
		with inherited disorders.
Genethon	http://www.genethon.fr/genethon_e	The Human Genome Research
	n.html	Centre.
GSDB: Genome	http://www.ncgr.org/	A collection of DNA sequence
Sequence database		data and related information.
HGP: Human Genome	http://www.oml.gov/TechResources	Useful background & links.
Project Information	/Human_Genome/home.html	
Human Gene Mutation	http://www.uwcm.ac.uk/uwcm/mg/s	Mutations
Database	earch	
NCBI	http://www.ncbi.nlm.nih.gov/	KEY SITE. Nucleotide
	•	Sequence retrieval start point.
OMIM: Online	http://www.ncbi.nlm.nih.gov/Omim	This database is a catalog of
Mendelian Inheritance in	1	human genes and genetic
Man		disorders.
PubMed	http://www.ncbi.nlm.nih.gov/PubM	PubMed accesses MEDLINE
	ed/	medica literature database and
		links to full-text journals. It is
		also the literature component
		of the Entrez retrieval system
	·	for molecular biology
		information.
Research Tools (Science	http://www.ncbi.nlm.nih.gov/SCIE	A Gene Map of the Human
- NCBI)	NCE96/ResTools.html	Genome.
RHdb: Radiation Hybrid	http://www.ebi.ac.uk/RHdb	Radiation Hybrid Database.
Database, Hinxton, UK		readiation Trybing Database.
Stanford Human	http://www.shgc.stanford.edu/	Sequence database.
Genome Centre	i i i i i i i i i i i i i i i i i i i	or e
HUGO: The Human	http://www.gene.ucl.ac.uk/hugo	HUGO is the international
Genome Organisation		organisation of scientists
Control C. Sundanon		involved in the Human
		Genome Project.
TIGR: The Institute for	http://www.tigr.org/	Genomic databases.
Genomic Research	imp/ www.ugi.org/	Genomic databases.
The National Human	http://www.nhgri.nih.gov/	Aggas to as succession
Genome Research	mtp.//www.inigii.iliii.gov/	Access to sequence databases
Institute		
monute		

The Whitehead Institute Center for Genome Research	http://www.genome.wi.mit.edu/	Genome map and sequence information.
Unigene: Unique Human Gene Sequence Collection. (NCBI)	http://www.ncbi.nlm.nih.gov/UniGe ne/index.html	UniGene is a system for automatically partitioning GenBank sequences into a non-redundant set of geneoriented clusters. Each UniGene cluster contains sequences that represent a unique gene, as well as related information such as the tissue types in which the gene has been expressed and map location.
University of Oklahoma	http://dna1.chem.ou.edu/index.html	Genomic databases
WEHI, Melbourne, Aus	http://wehih.wehi.edu.au/srs/srsc/	Sequence Retrieval System

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Genes coding for proteins known to play a key role in organ function or disease are designated 'candidate genostic genes'. Variations within the gene structure may alter the regulatory or structural integrity of the gene product leading to enhancement or reduction in the specific function (e.g. receptor binding, enzyme activity). The exact role that a candidate gene plays in disease, prognosis and healthcare management can be fully ascertained by assessing the effects of variation in gene structure in particular patient groups, populations or individuals (see examples 2,3 and 4).

EXAMPLE 2 - Candidate Genostic Genes

Human Neuronal Nitric Oxide Synthetase

Gene Map Locus: 12q24.2q24.31(OMIM Ref. 163731).

One candidate 'genostic' gene is the gene encoding nitric oxide synthetase (NOS-1).

The enzymes responsible for NO synthesis in man constitute a family with at least three distinct isoforms: inducible, endothelial, and neuronal. Neuronal NO synthetase (NOS-1) is localised to human chromosome 12, and participates in diverse biologic processes including neurotransmission, the regulation of body fluid homeostasis, neuroendocrine physiology, control of smooth muscle motility, sexual function and monocyte biology.

Burnett et al. (1992) localized NO synthase to rat penile neurons innervating the corpora cavernosa and to neuronal plexuses in the adventitial layer of penile arteries. They demonstrated that small doses of NO synthase inhibitors abolished electrophysiologically induced penile erections establishing that nitric oxide is a physiologic mediator of erectile function.

Kharazia et al. (1994) found that all neurons in the striatum and many in the cortex were positive for nitric oxide synthase indicating a role of NOS in brain function.

NOS1 cDNA clones contain different 5-prime terminal exons spliced to a common exon 2. Xie et al. (1995) demonstrated that the unique exons are positioned within 300 bp of each other but separated from exon 2 by an intron that is at least 20 kb long. A CpG island engulfs the downstream 5-prime terminal exon. In contrast, most of the upstream exon resides outside of this CpG island. The upstream exon includes a GT dinucleotide repeat. The expression of these 2 exons is subject to transcriptional control by separate promoters. Nitric oxide is synthesized in skeletal muscle by neuronal-type NO synthase, which is localized to sarcolemma of fasttwitch fibers. Synthesis of NO in active muscle opposes contractile force. Brenman et al. (1995) showed that NOS1 partitions with skeletal muscle membranes owing to association of enzyme with dystrophin, the protein mutated in Duchenne muscular dystrophy. The dystrophin complex interacts with an N-terminal domain of NOS1 that contains a GLGF motif. Both humans with DMD and mdx mice show a selective loss of NOS1 protein and catalytic activity from muscle membranes. NOS1-deficient mice are resistant to neural stroke damage following middle cerebral artery ligation. Nelson et al. (1995) reported a large increase in aggressive behavior and excess, inappropriate sexual behavior in NOS1 'knockout' mice. Initial observations indicated that male (but not female) NOS1-deficient mice engaged in chronic aggressive behavior.

Magee et al. (1996) used PCR to clone a novel form of neuronal NOS from rat penile RNA. This NOS cDNA was termed PnNOS for 'penile neuronal NOS.' Sequencing revealed that the PnNOS cDNA was identical to rat cerebellar neuronal NOS1 except for a 102-bp insertion in PnNOS. Repetition of RT-PCR showed PnNOS to be the only form of NOS1 expressed in rat penis, urethra, prostate, and skeletal muscle. PnNOS may be responsible for the synthesis of nitric oxide during penile erection and may be involved in control of the tone of the urethra, prostate, and bladder.

Using the available genomic sequence of neuronal NOS-1 it is possible to identify those parts of the gene which show variation sufficient to alter the normal functioning of the gene.

1.) Transcriptional Promoter Sequences:

Sequence mutations in the promoter region of the NOS1 gene will allow the identification of individuals with altered transcriptional regulation control.

2.) RNA Processing (Splicing) Sequences:

Characterise mutations in the intron/exon structure of the NOS1 gene to identify individuals with altered RNA splicing patterns. These results in truncated proteins or splice variants with an altered function.

3.) Messenger RNA Translation and Stability Sequences:

Sequence and characterise mutations within the repetitive sequences located in the 3' untranslated region of the NOS-1 gene. These individuals have altered translational control of their mRNA.

4.) DNA Sequences Involved in Genomic Rearrangement or Expansion:

The presence of Alu-1 repeat, which are known to cause recombination, allows one to detect gross chromosomal rearrangements. Changes in either the sequence or the genomic structure may well correlate with clinical or pathological symptoms.

102-bp insertion will also be involved in the functional variation of activity involving the urogenital tract.

5.) Coding Sequences:

Mutations and polymorphisms in the coding (exon) sequences of the NOS-1 gene will result in changes at the structural level of the protein with functional changes. Amino acid substitutions, within neuronal NOS-1, will play a role in age/brain related neuronal defects.

The specific sequences are detailed in Table 2.

<u>TABLE 2: Summary of Genome Elements within the Neuronal Nitric Oxide</u>
<u>Synthetase Gene.</u>

Gene Anatomy	Key Region	Functional Elements
1. 5' Flanking Region:	GC-enriched sequences:	DNA methyltransferase foot print region CpG Island
	Promoter elements	TATA box Inverted CAAT boxes AP-2-like element CREB/ATF element c-Fos element NF-kB-like ETS-binding sites TEF-1/MCBF binding sites NRF-1 binding sites RNA Pol III site
2. Exon Coding Regions		Translation initiation exon 2 Translation termination exon 29
3. RNA Processing		Intron/exon boundaries (1-29) Cassette splicing exons 9-11
4. RNA Translation		3' Untranslated Region
5. Insertion		102bp insertion
6.Repetitive Sequences		Alu-1 family Dinucleotide repeats

These variations in the genomic structure of the human NOS 1 gene are important in controlling the physiological role of NOS in normal or disease states in humans. Alterations in the physiology of NOS have significant healthcare indications (i.e stroke, cardiac and circulatory disease, urogenital disease and dysfunction, psychiatric symptoms and musculoskeletal disorders).

In consideration with an assessment of the functional variation in other genes, identification of the pattern of NOS 1 gene variation in a patient cohort, population or individual offers a powerful practical tool for improving the management of healthcare and the prognosis of health risk.

EXAMPLE 3

Voltage-gated calcium channels

Gene map locus (OMIN Ref.601011)

Other candidate 'genostic' genes are the calcium channel subunit genes.

There are six functional subclasses of calcium channel. Voltage-dependent Ca(2+)

channels not only mediate the entry of Ca(2+) ions into excitable cells but are also involved in a variety of Ca(2+) – dependant processes, including muscle contraction, hormone or neurotransmitter release and gene expression.

Calcium Channels are multi-subunit complexes and the channel activity is directed by a pore-forming alpha-1 sub-unit. The auxillary sub-units beta, alpha-2/delta, and gamma regulate channel activity. Ca(2+) currents have been described on the basis of their biophysical and pharmacological properties and include L-, N-, T-, P-, Q-, and R- types.

P/Q type channels colocalise with a subset of docked vesicles at the synapse where they control exocytosis, demonstrated by the sensitivity of various types of neurotransmission to specific blockers of these channels. P/Q type channels are involved in CSD (cortical spreading depression – which causes the aura or visual symptoms of migraine) and release of neurotransmitters, including 5-HT (migraine patients have systemic disturbance of 5-HT metabolism).

The distinctive properties of each of the Ca(2+) channel types are primarily related to the expression of a variety of alpha-1 isoforms (Dunlap et al., 1995). There are at least 6 classes of alpha-1 subunits: alpha-1A, B, C, D, E and S. They are derived from 6 genes representing members of a gene family. The alpha-1A, B and E isoforms are abundantly expressed in the neuronal tissue. The genes encoding the alpha-1A, B, and E isoforms are symbolised CACNL1A4, CACNL1A5, and CACNL1A6 respectively.

The CACNL1A4 gene was assigned to 19p13, (Diriong et al., 1995). The gene was characterised by Ophoff et al. (1996) in preparation for a mutation search in neurological disorders that map to 19p13. They found that the gene covers 300 kb with 47 exons and reported the amino acid sequence for residues 1-2262. Sequencing of all the exons and their surroundings revealed polymorphic variations, including a (CA)n-repeat, a (CAG)n-repeat in the 3-prime-UTR, and different types of deleterious mutations in 2 neurological disorders; familial hemiplegic migraine and episodic ataxia type 2. Thus, these 2 neurological disorders are allelic channelopathies.

Calcium channels are also known to be important in regulating the function of the heart (particularly arrhythmias) and a number of drugs express their therapeutic effects by blocking myocardial Ca(2+) or prolonging the activation time of the channel (Brody, Larner and Minneman 1998). Polymorphic variation can help predict individual response to injury and disease, the symptoms and consequences of cardiovascular disease, dysfunction and damage to the system.

EXAMPLE 4

Lipoprotein lipase LPL
Gene map locus (OMIN Ref.238600)

A third example of a candidate for a 'genostic' gene is the enzyme lipoprotein lipase (LPL).

Human lipoprotein lipase is a member of a lipase gene family, which also includes the hepatic and pancreatic lipases. LPL is located on the surface of endothelial cells of capillaries where it hydrolyses triacylglycerols of plasma lipoproteins to fatty acids and glycerol. These fatty acids are then taken up by cell and used for energy production. The enzyme plays a central role in lipid metabolism and is a candidate susceptibility gene for cardiovascular disease.

The LPL gene contains ten exons spanning 30kb and encodes a protein of 475 amino acids and has several well characterised functional domains including the APOC-II binding site, the heparin-binding clusters used to localise LPL to the endothelial wall and the domains that contribute to the active site.

Diseases that affect the metabolism and transport of lipids frequently result in abnormally high plasma triacyglycerols and or cholesterol that are often associated with coronary artery disease, artherosclerosis and/or obesity. DNA sequence variation in genes that encode many of the enzymes and proteins involved in lipid metabolism and transport (including LPL) have been identified and associated with clinically abnormal lipid profiles.

The LPL gene sequence has been shown to contain distinct sequence variations among populations, (Nickerson et al, 1998). Nickerson et al described 88 variants in a region of the LPL gene, 90% of which were single nucleotide polymorphisms (SNPs), the remaining being insertion-deletion variations. 81 variants were found in intronic regions, and 7 in the exonic sequence. Only 4 of the exonic variants altered the protein sequence.

Assessing the functional variability of the LPL gene in conjunction with the functional variability of other core genes will provide a tool in predicting the likelihood of developing a range of diseases including the symptoms and consequences of coronary artery disease, artherosclerosis and/or obesity.

As shown above, sequence data for genes of interest can be readily obtained. Genetic variation in specific regions of genes can also be determined. The identification of a core group of genes which have important effects on the key physiological and pathophysiological processes in human disease would form an important medical advance.

A device or detector configured and designed using this core group of genes (GENOSTIC) would have a general utility in the practice of medicine and healthcare management for:

- prognosing the course of illness
- predicting likely therapeutic response
- identifying potential adverse event profile.

EXAMPLE 5

LIST OF GENES WITH KNOWN ASSOCIATION WITH DISEASE

The following are examples of genes with known associations with disease which can be discerned by a careful review of the medical and biochemical literature and by experimentation. Many such genes can also be identified by a review of publicly available databases e.g. Human Gene Mutation Database (http://www/uwcm.ac.uk/uwcm/mg/search/), OMIM Database (http://www.ncbi.nlm.nih.gov/omim) or GENECARDS (http://bioinformatics.weizmann.ac.il/cards/index.html).

Note: The tabulated genes are listed in alphabetical groups, but the numbering of genes within each group is not necessarily continuous.

Α	В	С	D
1: APOA4	1: BLM	1: CRYAA	1: DPYD
2: AAC2	2: BCKDHA	2: CRYBB2	2: DIAPH1
3: AD2	3: BTD	3: CHM	3: DMD
4: AGA	4: BPGM	4: C2	4: DPYS
5: APOA1	5: BRCA2	5: C5	5: DFN1
6: ALAS2	6: BRCA1	6: C9	6: DKC1
7: ALB	7: BCP	7: C3	7: DLD
8: APT1	8: BLMH	8: C7	8: DFNA5
9: APOA2	9: BCKDHB	9: CTNS	9: DTD
10: APOH	10: BCHE	10: C1QA	10: DCX
11: AMELX	12: BTK	11: C1QB	11: DYT1
12: APT1LG1	13: BARD1	12: CNGA3	12: DMPK
13: A2M	18: BSEP	13: C1QG	13: DRD4
14: APBB1		14: CPO	14: DDB2
15: AGXT		15: CDH1	15: DIAPH2
16: AGTR1		16: C4A	16: dgcr5
17: ALDH2		17: C4B	17: DRD2
18: ARG1		18: C6	18: DES
19: ALD		19: C8B	19: DBT
20: AGT		20: CACT	20: DCP1
21: ACHE		21: chit	24: DYSF
22: ADSL		22: CLCN1	27: DRA
23: ADRB3		23: CFTR	29: DLX3
24: atpsk2		24: COL10A1	31: DRPLA
25: ATM		25: CYP1A1	38: DIA1
26: ASPA		26: CLCNKB	39: DHAPAT
27: ACTC		27: CD3G	
28: ADRB2		28: CACNA1F	
29: AIRE		29: CPS1	
30: AZF1		30: CRX	
31: AT3		31: CYBA	
32: ABO		32: CKN1	
33: ABCR		33: CST3	
34: AACT		34: CNGA1	
36: ANK1	٠.	35: CETP	
37: ALAD		36: CAT	
38: APOE		37: CTSK	
39: APP	1	38: CYBB	
40: APOC3		40: CSX	

E	F	G	H
1: EPOR	1: FUCA1	1: GM2A	2: HD
2: EPB41	2: FRDA	2: GYPC	3: HK1
3: EMX2	3: FGB	3: GALT	5: HBG2
4: EXT2	4: FH	4: GLB1	6: HSD3B2
5: EMD	5: FGG	5: GALE	7: HBG1
6: ED1	6: FMR2	6: GAMT	9: HFE
7: ESR	7: FGFR1	7: GYPA	10: HTN3
8: EXT1	8: FGA	8: GPI	11: HOXA13
9: EPHX1	9: F10	9: GPC3	12: HR
10: EPX-PEN	10: FUT6	10: GLI3	13: HBA1
11: EDNRB	11: FKHL15	11: GCDH	14: HMGCL
12: EPM2A	12: FRAXF	12: GAA	15: HBD
13: EDN3	13: FBP1	13: G6PC	16: HTR2C
14: ETFA	14: F11	14: GBA	18: HP
15: ETFB	15: F12	15: GALK1	19: HSD11B2
16: ENG	16: FCGR1A	16: GBE1	20: HK2
17: EPB42	17: FBN2	17: GLS	21: HPS
18: ETFDH	18: FAH	18: G6PT1	23: HGD
19: EFE2	19: FSHR	19: GLUD1	25: HBA2
20: ERCC5	20: F13B	20: GRL	26: HCF2
22: ERCC∔	21: FMO3	21: GSS	27: HRG
23: ELN	22: FUT3	22: GK	28: HOXD13
24: EYA1	23: F13A1	23: GP1BB	29: HEXB
25: ERCC6	24: FANCA	24: GSN	32: HLCS
26: ERCC3	25: F7	25: GCGR	33: HPRT1
27: EGR2	26: FTL	26: GLRA1	-34: HBB
28: ERCC2	27: F5	27: GH1	35: HTR1A
	28: FUT2	28: G6PD	36: HSD17B1
	29: FMR1	29: GYS2	37: HSD17B3
	30: FCMD	30: GHRHR	40: HSD17B4
	31: FGDY	31: GH2	
	32: FANCC	32: GCP	
	33: FCGR2A	33: GALC	
	34: FGFR3	34: GP9	
	35: FECH	35: GNRHR	
	36: FSHB	36: GIPR	
	37: F8C	37: GSTT1	
	38: FBN1	38: GLA	
	39: FABP2	39: GRPR	
	40: F9	40: GPD2	

I	J	K	L
1: IL2RA	1: JAG1	1: KRT9	1: LPL
2: IVD	2: JAK3	2: KCNQ3	2: LIPC
4: IFNGR1		3: KRT1	3: LOR
5: IL2RG		4: KNG	4: LDLR
6: IFNGR2		5: KRT16	5: LYZ
7: IGHG2		6: KRT18	6: LIG1
9: INSR		7: KRT6A	7: LDHA
10: IDUA		8: KRT6B	8: LDHB
11: IL4R		9: KRT3	9: LQT2
12: ITGA7		10: KHK	10: LEPR
13: ITGA2B		11: KRTHB1	11: LHCGR
14: IGKV		12: KEL	12: LEP
15: IAPP		13: KRTHB6	13: LHB
16: IPF1		14: KAL1	14: LIPA
17: INS		15: KRT4	15: LAMA3
18: IGF1		16: KRT13	16: L1CAM
19: IGHM		17: KRT2A	17: LAMC2
20: ITGA6		18: KRT12	19: LCAT
21: IRS1		19: KRT5	20: LAMA2
22: ICAM1		20: KRT14	21: LMX1B
23: ITGB3		21: KRT10	22: LTBP2
24: ITGB4		22: KRT17	23: LMAN1
25: IDS		23: KCNQ2	26: LAMB3
28: ITGB2		24: KCNQ1	
		26: KCNJ1	
		28: KCNJ11	
·		30: KCNA1	
		32: KIT	
		36: KCNE1	

M	N	0	P
1: MTM1	1: NME1	1: OA1	1: PROP1
2: MUT	2: NF1	2: OCA2	2: PLP
3: MTR	3: NBS1	3: OCRL	3: PRPS1
4: MLH1	4: NPHP1	4: OXCT	4: PEPD
5: MMP3	5: NF2 .	5: OPHN1	5: PCCB
6: MVK	6: NCF1	6: OTC	6: PCCA
7: MANBA	7: NDP	7: OAT	7: PCSK1
8: MTRR	8: NCF2	8: COL1A2	8: PAH
9: MANB	9: NP		9: POU1F1
10: MPO	10: NEU		10: PPOX
11: MYO5A	11: NTF3		11: PRKCG
12: MYH7	12: NOTCH3		12: PXMP1
13: MAOA	13: NRTN		13: PPGB
14: MYOC	14: CHRNA4		14: PRB3
15: MADH4	15: NPC1		15: PRB1
16: MEFV	16: NAGA		16: PRB4
17: MAT1A	17: NEFH		17: PMP22
18: MEN1	18: NTRK1		18: PABP2
19: MOCS1	19: NAIP		19: PEX7
20: mocs1b	20: NDUFS4		20: PDDR
21: MLR	21: NOS3		21: PAFAH2
22: MSH2	23: NODAL		22: PARK2
23: MSX2	25: NAGLU		23: PLG
25: MPI			24: PPARG
26: MC4R			25: PON2
28: MDCR			26: PROC
29: MBL			27: PROS1
30: MJD			28: PDE6A
31: MC2R			29: PXMP3
32: MYL2			30: PPP1R3
33: MC1R			31: PON1
34: MYO15			32: PEX1
35: MAPT			33: PC
36: MPZ			34: PENK
37: MID1			35: PXR1
38: MSX1			36: PGK1
39: MGAT2			37: PTH
40: MTHFR			38: PDE6B
			39: PSEN2
			40: PKD2

Q	R	S	T
1: QDPR	1: RHO	1: SSA1	1: TAT
	2: RP2	2: SOD1	2: THBD
	3: RLBP1	3: COL2A1	3: TNNT2
	4: RHD	4: SDH2	4: TF
	5: RB1	5: SGSH	5: TBG
	6: ROM1	6: SLC5A5	6: TSC1
	7: RP3	7: SLC12A3	7: TCN2
	8: RHCE	8: SDH1	8: TPI1
	9: RHAG	9: SUOX	9: TPM1
	10: RHOK	10: STS	10: TBXA2R
	12: rfxank	11: ssadh	11: TPMT
	13: REN	12: SALL1	12: TYR
	14: RYR1	13: SHOX	13: TGM1
	15: RS1	14: SLC12A1	14: TTR
	16: RDS	15: SLC2A2	15: TSC2
	17: RFC2	16: SNRPN	16: TG
	18: RCP	17: SPTB	17: TTPA
	21: RFXAP	18: SCA2	18: TCOF1
	22: RAG2	19: SMN1	19: TULP1
	23: RPS6KA3	20: STK11	20: TNF
	24: RPE65	21: SPTA1	21: THPO
	25: RFX5	23: SH2D1A	22: TCF2
	26: RAG1	24: SCNN1B	23: TPO
		25: SI	24: TEK
		26: SCA1	25: TPM3
		27: SLC2A1	26: TYRP1
_		28: SELE	27: TGFBI
		31: SAA1	28: TSHB
		32: SNCA	29: TNNI3
·		33: SOD3	30: TIMP3
		34: SCN1B	31: TECTA
		35: SLC6A4	32: TAP1
		36: SRK	33: TCF14
		37: SLC5A1	36: TH
		39: SLC10A2	37: TSHR
			38: THRB
		·	39: TAP2
			40: TGFBR2

U	V	W	X
1: UMPS	1: VWF	1: WT1	1: XPA
2: UGB	2: VDR	2: WFS1	2: XDH
3: USH2A	3: VMD2	3: WRN	3: XPC
4: UFD1L	4: VHL	4: WAS	6: XK
5: ugt1d			8: XIST
6: UROD			9: XRCC9
7: UBE3A			
8: UCP3			
9: UROS			
10: UGT1			
Y	Z		
	1: ZIC2		
	2: ZIC3		

EXAMPLE 5a

POLYMORPHIC VARIATION

For each gene, sequence data concerning the existence of polymorphic variation can be located. For example, below are the details of the polymorphic variations of six genes, representative of major gene product/protein categories on the core list.

Category 1 - Enzymes

α -glucosidase

Mutation type	Total number of mutations
Nucleotide substitutions (missense / nonsense)	20
Nucleotide substitutions (splicing)	4
Nucleotide substitutions (regulatory)	0
Small deletions	7
Small insertions	0
Small indels	0
Gross deletions	1
Gross insertions & duplications	0
Complex rearrangements (including inversions)	1
Repeat variations	0
TOTAL	33

Accession Number	Codon	Nucleotide	Amino acid	Phenotype
CM970540	40	cCGA-TGA	Arg-Term	Glycogen storage disease 2
CM950491	299	CTG-CGG	Leu-Arg	Glycogen storage disease 2
CM980577	309	cGGG-AGG	Gly-Arg	Glycogen storage disease 2
CM910167	318	ATG-ACG	Met-Thr	Glycogen storage disease 2
CM900102	402	aTGG-CGG	Trp-Arg	Glycogen storage disease 2
CM940798	519	cATG-GTG	Met-Val	Glycogen storage disease 2

CM910168 521	cGAG-AAG	Glu-Lys	Glycogen storage disease 2
CM940799 545	CCT-CTT	Pro-Leu	Glycogen storage disease 2
CM980578 566	cTCC-CCC	Ser-Pro	Glycogen storage disease 2
CM930287 643	cGGG-AGG	Gly-Arg	Glycogen storage disease 2
CM940800 645	GACg-GAA	Asp-Glu	Glycogen storage disease 2
CM980579 645	cGAC-AAC	Asp-Asn	Glycogen storage disease 2
CM950492 645	cGAC-CAC	Asp-His	Glycogen storage disease 2
CM940801 647	TGCg-TGG	Cys-Trp	Glycogen storage disease 2
CM980580 648	cGGC-AGC	Gly-Ser	Glycogen storage disease 2
CM980581 672	CGG-CAG	Arg-Gln	Glycogen storage disease 2
CM980582 672	gCGG-TGG	Arg-Trp	Glycogen storage disease 2
CM930288 725	cCGG-TGG	Arg-Trp	Glycogen storage disease 2
CM980583 768	CCC-CGC	Pro-Arg	Glycogen storage disease 2
CM930289 854	cCGA-TGA	Arg-Term	Glycogen storage disease 2
	_		
IVS	nor/ Relativ	Substitution	Phenotype
Number Ac	ceptor location	n ·	••
CS941486 1 as	-13	T-G	Glycogen storage disease 2
CS971665 6 as	-22	T-G	Glycogen storage disease 2
CS941487 10 ds	+1	G-C	Glycogen storage disease 2
CS971666 16 ds	+2	T-C	Glycogen storage disease 2
Ai T continu			•
Accession Location/ Number codon	Deletion		Phenotype
CD981927 126	GCAGCCC^T	GGtgCTTCTTCCCA	Glycogen storage disease 2
CD972136 160		TCccCAAGGACATC	Glycogen storage disease 2
CD941678 174		ACtGAGAACCGCC	Glycogen storage disease 2
CD961963 470		ACgagaCCGGCCAGCC	Glycogen storage disease 2
CD941679 485		CTgccttccccgactTCACCA/	
CD981928 674		CAacaGCCTGCTCAG	Glycogen storage disease 2
CD951684 902		AGaagGTGACTGTCC	Glycogen storage disease 2
			, 5
Description			Phenotype
536 bp I17E18-332 to		D	Glycogen storage disease 2
(mutation described at	genomic DNA I	ever)	-
Description			Phenotype
Ins C nt. 2741, ins G n	t. 2743		Glycogen storage disease 2
			,

Category 2 - Transport and Storage

Albumin

Mutation type	Total number of mutations
Nucleotide substitutions (missense / nonsense)	21
Nucleotide substitutions (splicing)	2
Nucleotide substitutions (regulatory)	0
Small deletions	2
Small insertions	1
Small indels	0
Gross deletions	0
Gross insertions & duplications	0
Complex rearrangements (including inversions)	0
Repeat variations	0
TOTAL	26

Accession Number	Codon	Nucleotide	Amino ac	id Phenotype	
CM910024	1	GAT-GTT	Asp-Val	Albumin varia	nt
CM940018	3	aCAC-TAC	His-Tyr	Albumin varia	nt
CM910025	-1	CGA-CAA	Arg-Gln	Albumin varia	nt
CM910026	-2	CGT-CAT	Arg-His	Albumin varia	nt
CM900011	-2	tCGT-TGT	Arg-Cys	Albumin varia	nt
CM940019	32	tCAG-TAG	Gln-Term	Analbuminaer	nia
CM940020	114	cCGA-TGA	Arg-Term	Analbuminaer	nia
CM910027	128	CAT-CGT	His-Arg	Albumin varia	nt
CM940021	214	TGGg-TGA	Trp-Term	Analbuminaer	nia
CM920015	218	CGC-CAC	Arg-His	Albumin varia	nt
CM970070	218	CGC-CCC	Arg-Pro	Dysalbuminae	mic hyperthyroxinaemia, familial
CM940022	225	cAAA-CAA	Lys-Gln	Albumin varia	
CM940023	276	AAGg-AAC	Lys-Asn	Albumin varia	nt
CM940024	313	AAGg-AAT	Lys-Asn	Albumin varia	nt
CM910028	365	GAT-GTT	Asp-Val	Albumin varia	nt
CM910029	372	cAAA-GAA	Lys-Glu	Albumin varia	nt
CM900012	501	aGAG-AAG	Glu-Lys	Albumin varia	nt
CM930016	505	tGAA-AAA	Glu-Lys	Albumin varia	nt
CM940025	563	cGAT-AAT	Asp-Asn	Albumin varia	nt .
CM910030	570	cGAG-AAG	Glu-Lys	Albumin varia	nt
CM940026	573	tAAA-GAA	Lys-Glu	Albumin varia	nt
Accession Number	Locatio codon	n/ Deleti	on		Phenotype
CD941562	566	TAAC	GGAG^AC	CtGCTTTGCCGA	Albumin variant
CD910474	579	TGCI	GCA^AG	TCAAGCTGCCT1	Analbuminaemia
Accession Number	Nucie	eotide	Codon	Insertion	Phenotype
CI941818	9156		267	A	Analbuminaemia

Category 3 - Structural Proteins

Collagen IV alpha 3

Mutation type	Total number of mutations
Nucleotide substitutions (missense / nonsense)	2
Nucleotide substitutions (splicing)	1
Nucleotide substitutions (regulatory)	0
Small deletions	2
Small insertions	0
Small indels	0
Gross deletions	0
Gross insertions & duplications	0
Complex rearrangements (including inversions)	0
Repeat variations	0
TOTAL	5

Accession

Codon Nucleotide

Amino acid

Phenotype

Number CM940306 CM940307	1481 1524	aCGA-TCA-T		Arg-Term Ser-Term	-	syndrome syndrome
Accession Number CS951356	IVS Don-Acce	or/- eptor	Relative location -320	Substitution G-T		henotype lport syndrome
Accession Number	Location/ codon	Dele	tion			Phenotype
CD951631	1'448	TTT	GTC^TTCA	AccegacaCAGTCA.	AACC	Alport syndrome
CD941648	1471	AGT	GGGT^TT	TcttttCTTTTTGTA	.C	Alport syndrome

Category 4 - Immune Protection and inflammation

Interleukin 4 receptor

Mutation type	Total number of mutations
Nucleotide substitutions (missense / nonsense)	1
Nucleotide substitutions (splicing)	0
Nucleotide substitutions (regulatory)	0
Small deletions	0
Small insertions	0
Small indels	0
Gross deletions	0
Gross insertions & duplications	0
Complex rearrangements (including inversions)	0
Repeat variations	0
TOTAL	1

Accession Number	Codon	Nucleotide	Amino acid	Phenotype
CM970744	576	CAG-CGG	Gln-Arg	Atopy, association with

Category 5 – Generation and Transmission of Nervous Impulses

Prion protein

Mutation type	Total number of mutations
Nucleotide substitutions (missense / nonsense)	14
Nucleotide substitutions (splicing)	0
Nucleotide substitutions (regulatory)	0
Small deletions	0
Small insertions	0
Small indels	0
Gross deletions	0
Gross insertions & duplications	0
Complex rearrangements (including inversions)	0
Repeat variations	0
TOTAL	14

Accession	Codon	Nucleotide	Amino acid	Phenotype
Number	•			••
CM890102	102	CCG-CTG	Pro-Leu	Gerstmann-Straeussler syndrome
CM930595	105	CCA-CTA	Pro-Leu	Gerstmann-Straeussler syndrome
CM890103	117	GCA-GTA	Ala-Val	Gerstmann-Straeussler syndrome
CM890104	129	cATG-GTG	Met-Val	Gerstmann-Straeussler syndrome
CM971202	171	AAC-AGC	Asn-Ser	Schizophrenia
CM910305	178	cGAC-AAC	Asp-Asn	Creutzfeld-Jakob syndrome
CM930596	180	cGTC-ATC	Val-Ile	Creutzfeld-Jakob syndrome
CM971203	183	cACA-GCA	Thr-Ala	Spongiform encephalopathy, familial
CM920588	198	TTC-TCC	Phe-Ser	Gerstmann-Straeussler syndrome
CM890105	200	cGAG-AAG	Glu-Lys	Creutzfeld-Jakob syndrome
CM961133	208	CGC-CAC	Arg-His	Creutzfeld-Jakob syndrome
CM930597	210	gGTT-ATT	Val-Ile	Creutzfeld-Jakob syndrome
CM920589	217	CAG-CGG	Gln-Arg	Gerstmann-Straeussler syndrome
CM930598	232	ATG-AGG	Met-Arg	Creutzfeld-Jakob syndrome
		1		

Category 6 - Growth and Differentiation

Vitamin D receptor

Mutation type	Total number of mutations
Nucleotide substitutions (missense / nonsense)	10
Nucleotide substitutions (splicing)	1
Nucleotide substitutions (regulatory)	0
Small deletions	0
Small insertions	0
Small indels	0
Gross deletions	0
Gross insertions & duplications	0
Complex rearrangements (including inversions)	0
Repeat variations	0
TOTAL	11

stant

The identification of the core group of genes considered to have an important effect

on the physiological and pathophysiological processes of disease enables attention to be focussed on ascertaining, identifying and cataloguing the genetic vatriation within the core group of genes utilising tried and tested technologies and techniques.

EXAMPLE 6 IDENTIFYING AND DETECTING POLYMORPHIC VARIATION IN THE CORE LIST OF GENES

The human genome is known to be highly variable in different individuals. Variation exists in approximately one nucleic acid residue in every 300. Although a single nucleic acid change (single nucleotide polymorphism, SNP e.g. Schafer and Hawkins 1997, Nickerson et al 1998, Rieder et al 1998, SNP Consortium 1999) is the commonest form of genetic variation, other more complex forms also occur for example:

Type of variation	Example		
Deletion	intronic deletion in the angiotensin converting enzyme gene		
Insertion	144bp insertion in the prion gene		
Repeats	Huntingtin gene in Huntington's chorea		

These more complex forms of genetic variations account for more than 40% of the genetic changes associated with human disease.

Variations in human gene sequences, which are present in more than 1% of the population, are known as polymorphisms. These changes in genetic sequence can be detected by a variety of methods, which allow the direct sequencing and correct alignment of nucleotides (e.g. the Sanger method). However, this method is prone to error and multiple runs are required to ensure accuracy. More recently (Schafer and Hawkins 1997, Gilles et al 1999) many other techniques have been developed to, accurately and sensitively, identify the presence of polymorphic variation based on:

- restriction fragment length polymorphisms using Southern blots
- allele specific extensions of a detection primer using high fidelity enzymes
- scanning for single strand conformational polymorphisms
- gel mobility detection of heteroduplexs
- detection of denaturing gradient differences using gel electrophoresis
- ribonuclease cleavage of RNA:RNA or RNA:DNA heteroduplexes
- chemical cleavage of heteroduplex mismatches

- gel based detection of resolvase cleavage using T4 endonuclease
- radioactive labelling and multi-photon detection
- detection of altered banding patterns on gels using cleavage fragment length polymorphisms
- recognition of heteroduplex mismatches using E. Coli mismatch repair enzymes
- DNA variation detection using denaturing high performance liquid chromatography
- matrix assisted laser desorption/ionisation time of flight mass spectrometry
- electronic array of DNA probes on silicon microchips

Therefore, given an identified gene sequence, the technology to identify polymorphic variation is well established and is generally applicable to any section of the human genome. (Nickerson et al 1998, Wang et al 1998, Rieder et al 1999).

In addition computational approaches can also be used to search for and assess polymorphic variation in existing gene sequence databases (as confirmed by Buetow et al 1999).

Thus the methods of generating the nucleotide sequence required for the design of an array or chip is well known to those skilled in the art.

However, for the purposes of an array design it would be useful to establish the frequency of a given polymorphism in the general population and thus derive a way of assessing its likely clinical importance. Polymorphisms are defined as being a genetic variation present in more than 1% of the population. In order to determine the frequency of a polymorphism in a given population a number of individual DNA samples will need to be investigated. The table below provides the number of DNA samples, which will need to be examined in order to determine the frequency of polymorphisms at a particular threshold of statistical certainty.

NUMBER OF DNA SAMPLES REQUIRED TO DETECT POLYMORPHISMS

Minimum Allele Frequency	Appears Once	Appears Twice	Statistical Certainty
> 1%	58	97	90%
	75	119	95%
	115	166	99%
> 5%	12	19	90%
	15	24	95%
	23	33	99%
> 10%	6	10	90%
,	8	12	95%
	11	16	99%

E.g. if a particular variant appears twice in 166 DNA samples, we can be 99% sure that the variant allele is present in >1% of the population.

The technologies and methodologies required for the identification and tabulation of polymorphic variation are of considerable value in the identification of genetic variation, which will be informative in the practice of medicine.

This invention provides a means of fusing the genomic and pharmacological profiles together with their clinical associations in such a way as to enhance and enable the provision of individually tailored therapeutic packages for enhanced healthcare management.

In addition, the use of such devices and the tabulating of genomic variations that lead to or predispose to disease, will lead to revolutionary insights into the pathophysiology of diseases. These may well lead to the classical definitions of disease states being sub-divided or re-organised into specific genomic configurations, creating the potential for new therapeutic approaches (as indicated in Drews and Ryser 1997).

The actual demonstration of associations between disease, outcomes, adverse events or specific symptom clusters will emerge as the result of clinical trials and investigations using accepted approaches and methods.

EXAMPLE 7 - ANALYSIS OF DATABASE TO ASCERTAIN GENOTYPE/PHENOTYPE RELATIONSHIPS

The generation of genetic profiling data and its analysis alongside clinical information derived from patients presents considerable challenges for data handling and analysis. The volume of information, number of information categories and the variable nature of the information (e.g. dimensional or categorical) ensure that the operation of a database combining genetic and clinical information to generate a prognostic outcome is a complex task.

However, the complexity can be dealt with using existing analytical approaches. Association analysis between genetic polymorphisms can be dealt with by using standard statistical techniques (analysis of variance, meta-analysis etc) with appropriate corrections for multiple testing. The thresholds for statistical significance will be derived from scientific convention (e.g. significance at the 5% level following Bonnferoni correction). The data concerning genotype/phenotype relationships between the core group of genes and clinical signs and symptoms and therapeutic interventions will form a central component of the database.

The creation of a database containing and elaborating on such genotype/phenotype relationships will become an important tool for the practice of molecular medicine and the development of healthcare management. In order to derive benefit from such a database it must be capable (following interrogation using a patients profile of genetic variation derived from the core group of genes) of analysing the profile and providing a meaningful output to the healthcare professional which will provide guidance on the

prognosis, healthcare management and therapeutic interventions appropriate to the patient.

The generation of such an output can be achieved using machine learning algorithms. The genetic algorithm (Goldberg 1989, Fogarty and Ireson 1994) has been shown to provide a general process for achieving good results for search in large noisy domains. Starting from a population of randomly generated points in a search space, and given an evaluation of each of those points, the genetic algorithm is designed to converge the population to an optimum point in the search space. Processes of data selection, crossover, mutation and replacement of old members of the dataset achieve this with new members of more value. The effective use of the genetic algorithm process is a representation of the search space, which is responsive to the heuristics, embodied in the genetic operators.

The user must also supply an evaluation function identifying the degree to which the point in space approaches an optimum ('weighting') such that the selection operator for propagation through the dataset can choose them.

The genetic algorithm can be used to find predictively meaningful categories that is:

- intervals of continuous attribute values
- sets of nominal attribute values
- combinations of attributes

Together these attributes can create a simple Bayesian classifier for aspects of healthcare management.

Additional techniques (e.g. Bahadur-Lazarsfeld expansion) enable second order approximation of dependencies between predictive attributes. This allows the full complexity of the individual's genetic variation profile and the specifics of their clinical, psychological and social state to be assessed in order to produce an output concerning their prognosis, healthcare management and the possibilities for therapeutic intervention.

Assembly of such data will allow the merging of accepted treatment algorithms with the polymorphic variation underlying specific aspects of genomic functionality. This will produce new algorithms that will provide a prognostic indication for individual patients and, coupled with the expertise of their responsible clinician, allow the appropriate healthcare decisions to be made in a pro-active way.

The identification of genetic variation in the core list of genes and its application to healthcare management will have significant beneficial effects on the way in which clinicians will be able to formulate plans for healthcare management.

This will be seen in at least two ways. The first by enabling the targeting of resources at appropriate individuals (see Example 8) and the second by enabling an objective risk assessment of the optimum configuration for different types of therapeutic intervention (e.g drugs, surgery, radiotherapy, occupational therapy) and the identification of those patients at significant risk of suffering adverse events from

therapeutic intervention (see Example 9).

EXAMPLE 8 - CLINICAL MANAGEMENT OF FAMILIAL ADEMATOUS POLYPOSIS

Familial adenomatous polyposis (FAP) is an autosomal dominant disorder which typically presents with colorectal cancer (CRC) in early adult life secondary to extensive adenomatous polyps of the colon. Polyps also develop in the upper gastrointestinal tract and malignancies may occur in other sites including the brain and the thyroid. Helpful diagnostic features include pigmented retinal lesions known as congenital hypertrophy of the retinal pigment, jaw cysts, sebaceous cysts, and osteomata. The APC gene at 5q21 is mutant in FAP.

CLINICAL FEATURES

Familial adenomatous polyposis (FAP) is characterized by adenomatous polyps of the colon and rectum; in extreme cases the bowel is carpeted with a myriad of polyps. This is an aggressive premalignant disease with one or more polyps progressing through dysplasia to malignancy in untreated gene carriers with a median age at diagnosis of 40 years. Carcinoma may arise at any age from late childhood through the seventh decade. The presenting features are usually those of malignancy, such as weight loss and inanition, bowel obstruction, or bloody diarrhea. Cases of new mutation still present in these ways but in areas with well organized registers most other gene carriers are detected by bowel examination while still asymptomatic. Occasionally, the extracolonic features of the condition lead to presentation.

Petersen et al. (1993) demonstrated the feasibility of presymptomatic direct detection of APC mutations in each of 4 families. No change in the conventional FAP colon screening regimen was recommended for children found to have a mutation. In contrast, when direct tests indicated that an individual did not have the mutation, they recommended that screening be decreased. Three of the mutations were nonsense mutations and one was a frameshift mutation due to insertion of 1 nucleotide. In an evaluation of molecular genetic diagnosis in the management of familial polyposis, Maher et al. (1993) concluded that intragenic and closely linked DNA markers are informative in most families and that, in addition to the clinical benefits of presymptomatic diagnosis, the reduction in screening for low-risk relatives means that molecular genetic diagnosis is a cost-effective procedure.

Davies et al. (1995) found that families with mutations 3-prime of codon 1444 had significantly more lesions on dental panoramic radiographs (P less than 0.001) and appeared to have a higher incidence of desmoid tumors than did families with mutations at the 5-prime end. All 7 families except one with mutations 5-prime of exon 9 did not express CHRPE. All of 38 individuals from 16 families with mutations between exon 9 and codon 1444 expressed CHRPE. The 11 individuals from 4 families with mutations 3-prime of codon 1444 did not express CHRPE. These results suggested that the severity of some of the features of Gardner syndrome may correlate with genotype in FAP.

Since an alteration of the APC gene occurs early in most colorectal tumors, detection of APC mutations in fecal tumor DNA could be a powerful tool for the diagnosis of noninvasive cancer. Deuter and Muller (1998) described a highly sensitive and nonradioactive heteroduplex-PCR method (HD-PCR) for detecting APC mutations in stool DNA.

Petersen et al. (1989) demonstrated how one could use linkage information to modify the standard recommendations for follow-up. For example, in the family of an affected 36-year-old man with a positive family history of APC, there were 4 asymptomatic children under the age of 10 years. Before linkage analysis, all children had a 50% risk. Screening protocols would call for annual sigmoidoscopy in all beginning at age 12 years. With the linkage information, one could state to the family with 98% confidence that 3 of the children did not inherit the gene and that 1 child did. That child could be screened annually; the others would have screening every 3 years beginning at ages 12 or 13 and continuing until age 35.

EXAMPLE 9 - GENETIC VARIATION IN DRUG TARGETS AND DRUG METABOLIZING ENZYMES

Therapeutic intervention by the use of drugs is a common mode of clinical treatment. However, this is not without difficulty (Weatherall, Leadingham and Warell 1996) and even hazard (Lazarou et al 1998). Drugs interact with the body in many different ways to produce their effect. Some drugs act as false substrates of inhibitors for transport systems (e.g. calcium channels) or enzymes (acetylcholinesterase). Most drugs however, produce their effects by acting on receptors, usually located in the cell membrane, which normally respond to endogenous chemicals in the body (Weatherall, Leadingham and Warrell 1996). Drugs that activate receptors and produce a response are called agonists (e.g cholinomimetics). Antagonists combine with receptors but do not activate them, thus reduceing the probability of the transmitter substance combining with the receptor and so blocking receptor activation. The ability of the drug to interact with the receptor depends on the specificity of the drug for the receptor or 'target' (Brody, Larner and Minneman 1998).

In addition to the main categories of agonist and antagonist, drugs also have mechanisms of action whereupon they interact with specific types of molecules - targets' - that include:

- blockade of uptake or transport sites (e.g selective serotonin reuptake inhibitors)
- enzyme inhibition (e.g. angiotensin convertying enzyme inhibitors, acetylcholinesterase inhibitors)
- blockade of ion channels (calcium channel antagonists, anaesthetics)

However, many drugs are known to vary in their efficacy and side effects from patient to patient. This variation in drug response will be associated with the polymorphic variation in the drug target.

CNS MARKETED DRUGS

Drug	Drug Target	Polymorphi
		c?

Tricyclic antidepressants	Neurotransmitter (NA/5-HT) re-uptake	√.
(TCA)	proteins (NET & SERT)	
SSRIs	Selective serotonin transport re-uptake	\checkmark
	protein (SERT)	
MAOIs	Monoamine oxidase A & B	✓
Benzodiazepines (GABA	GABA receptors	✓
facilitators)/GABA		
antagonists. Barbiturates.		
Beta-blockers	Noradrenaline (beta-adrenergic)	1
·	receptors	
Atypical antidepressants	Alpha-adrenoceptors	√
Beta-adrenoceptors	Beta-adrenoceptors	
antagonists		
Dopamine blockers/ boosters	Dopamine receptors	✓
Dopamine blockers/	Dopamine transporter (DAT1)	✓
boosters/depleters		
Anticholinergics (muscarinic	Muscarinic receptors	✓
antagonists)		
Anticholinergics	Nicotinic receptors	✓
(nicotinic antagonists)		
Anticholinesterases	Acetylcholinesterase (ACHE)	✓
COMT inhibitor	Catechol-O-methyltransferase	✓
	(COMT)	
Sodium channel blocker	Sodium channel	√
Opioid analgesics &	Opioid receptors (OPRM1; OPRK1;	\checkmark
antagonists	OPRD1)	
Antipsychotics/neuroleptics	5-HT/D2 receptors	✓
(5-HT/D2 antagonists)		
Antiinflammatory drugs	Cyclooxygenase (COX1, COX2)	√
Antihistamines	Histamine receptors	✓

CARDIOVASCULAR MARKETED DRUGS

Drug	Drug Target	Polymor phic?
ACE inhibitors	Angiotensin converting enzyme (ACE)	1
HMG CoA reductase inhibitors, e.g simvastatin	HMG CoA reductase	/
Angiotensin II antagonists	Angiotensinogen	✓
Calcium channel blocker	Calcium channel	1
Thromboxane A2 synthase inhibitor	Thromboxane A2 synthase	✓
A2 receptor antagonist	Thromboxane A2 receptor	✓
Potassium channel blocker	Potassium channel	✓
Na-H ion exchange (NHE) inhibitor	Na-H ion exchanger (NHE)	1
bile acid transport inhibitor	SLC10A1 (sodium/bile acid cotransporter)	/
bile acid transport inhibitor	SLC10A2 (sodium/bile acid cotransporter)	I

platelet aggregation inhibitor	Von Willebrand factor	1
ACAT inhibitor	Acetoacetyl-CoA-thiolase (ACAT)	1
Endothelin antagonist	Endothelin (EDN3)	1

GASTROINTESTINAL (Peptic ulcer) MARKETED DRUGS

Drug	Drug Target	Polymor phic?
Proton pump inhibitor (e.g omeprazole).	H+/K+ adenosine triphosphatase (ATPase) enzyme system ('proton pump')	1
H2 antagonists (e.g.cimetidine)	Histamine H2-receptor	1
Muscarinic antagonists (e.g.pirenepine)	Muscarinic m1 & m3 receptors	1
Prostaglandins (inhibit cAMP)	Adenylate cyclase, histamine-induced activity	1

Another problem the medical practitioner faces, is that certain patients may be particularly susceptible to drug addiction. Examples of drugs with known addictive properties are Amphetamines, Temazepam and Phenobarbitone, although having approved medicinal use e.g. phenobarbitone for epilepsy, they may cause problems of dependency and misuse in individuals. Knowledge of such an individual's susceptibility before prescribing certain drugs would be an advantage to the medical practitioner.

Any drug may produce unwanted or unexpected adverse events, these can range from trivial (slight nausea) to fatal (aplastic anaemia). One of the main reasons for adverse events following drug intake is the drug binding to a non specific or non target receptors in the body (Brody, Larner and Minneman 1998). Another reason is the interaction of the drug with other drugs given to the patient. This is a particular problem in the elderly who frequently suffer from multiple illnesses requiring many different classes of drugs and providing a real potential for drug interactions (Weatherall, Leadingham and Warrell 1996). The drug may also produce adverse events over time as the drug is absorbed, distributed, metabolised and excreted e.g. products of metabolising the drug may be reactive themselves and be toxic to the body. Being able to predict the likelihood of a particular individual suffering from an adverse event and the severity of that event would be an important tool for the practitioner. Many of the important components of the biological pathways involved in drug metabolism are coded by genes containing polymorphic variation.

METABOLISING ENZYMES

Drug	Drug-metabolising enzyme	Polymor phic?
Most	Cytochrome P450 enzyme, CYP2C19	1
Most	Cytochrome P450 enzyme, CYP2D6	1
Most	UDP-glucuronosyltransferase	1
Most	N-acetyltransferase (NAT1)	√

Most Sulphotransferase	
	1
Most NADPH-cytochrome p450 reductase	1

The inventory of drugs and preparations both registered and in development which can be matched to drug targets exhibiting genetic polymorphisms can be found in standard works of reference, in particular the British National Formulary, 1998, the Dental Practioners' Formulary, 1998, Martindale, 1998, Herbal medicines, 1998. Drugs available in the United States can be found in U.S. Pharmacopeia, 1998, and drugs available in Japan can be found in Iryoyaku Nihon Iyakuhinshu, 1998, Ippanyaku Nihon Iyakuhinshu, 1998 and Hokenyaku Jiten, 1998. Drugs available in other countries can be found in the appropriate National Formularies. A list of drugs currently under development worldwide can be found in current journals and text (Pipeline pulse, 1999, Scrip, 1998, IDrugs, 1998, Current Opinion in Drug Discovery and Development, 1998).

The use of the Genostic approach described above would be of considerable utility in determining the likelihood and magnitude of therapeutic response to individual and combinations of drugs in the inventories described above. Such difficulties can arise from adverse events, variations in metabolism and drug-drug interactions in situations where several diseases, requiring treatment, exist in a given patient. The potential for adverse events or deleterious outcomes could be ascertained in individuals, patients or populations in relation to all of the drugs referred to above. These factors are of considerable importance in enabling the selection and monitoring of therapeutic interventions and effective healthcare management.

There are a number of different aspects to this invention. With the GENOSTICTM approach, it would be possible to configure a different set of genes for each therapeutic area, across the whole of medicine, and for therapeutic intervention. The table below shows examples of the types of diseases included in each of the GENOSTICTM therapeutic areas.

Therapeutic Area	Diseases
ADME	Drug absorption, distribution, metabolism & excretion (ADME), toxicicity, responses to therapeutic intervention.
يستريان داري دمس في جايمودو پوري	The second section of the second section is a second section of the second section in the second section is a second section of the second section in the second section is a second section of the second section in the second section is a second section of the second section in the second section is a second section of the second section in the second section is a second section of the second section of the second section is a second section of the sect
Oncology	Cancers, carcinomas, sarcomas, gliomas
Central Nervous System	Neurological (e.g. retinal disorders, multiple sclerosis), neuropsychiatric, psychiatric, psychological & social dysfunction, disease and damage.
Behavioural disturbance	Aggression, violent behaviour, anxiety, sleep disorder, attention deficit disorder, appetitive disorder, addiction, depression, bipolar affective disorder

Head injury, mental retardation, epilepsy, stroke, seizures, brain tumors
Alzheimer's, Parkinson's, Huntington's, prion diseases, epilepsy, neurodegeneration,
Schizophrenia, OCD, depression, bipolar affective disorder
Heart failure, hypertension, vasculitis, arrhythmia, cholesterolaemia, cardiomyopathy, atherosclerosis, valvular disease, coarctation, aneurysms, blood disorders, COPD.
Gastric ulcers, duodenal ulcers, peptic ulcers, kidney disease, liver, pancreas, urinary, GERD (heartburn), nausea, diabetes mellitus, obesity
Lungs, anoxia, hypoxia, breathing problems, asthma, COPD, allergies
Injury, inflammation, infection, AIDS
Growth, differentiation, developmental disorders.
Cornea disease, abnormal pigmentation, conductive hearing loss, arthritis, osteoporosis, myopathies, muscular atrophy, myositis, myoblastoma, eczema, dermatitis.
Metabolism, reproduction, obesity Hormone action, diabetes
Migraine; trauma, infection
Infertility, impotency, male erectile dysfunction, female reproductive disorders

In a first aspect.

ADME (ABSORPTION, DISTRIBUTION, METABOLISM & ELIMINATION) & TOXICOLOGY

The invention relates to a method of assessing the most appropriate therapeutic intervention in an individual, patient, group or population suffering from the debilitating consequences of dysfunction, damage or disease of the body and its systems.

People vary enormously in their response to disease and also in their response to therapeutic interventions aimed at ameliorating the disease process and its progression. However, the provision of medical care and medical management is centered around observations and protocols developed in clinical trials on groups or cohorts of patients plan (Wetherall, Leadingham and Warrell 1996). This group data is used to derive a standardised method of treatment which is subsequently applied on an individual basis (e.g. the comment that drugs are often prescribed on the basis that everyone is an 70kg white male).

It is standard practice for clinicians to prescribe the same starting dose of a particular drug for a given indication and then adjust the treatment regimen by monitoring the progress of the disease and therapeutic response in individual patients. Observation of actual therapeutic outcome following these adjustments to patients therapy provides, the basis for determining a prognosis for the disease and developing a clinical management plan for patient care (eg. see Fig 1, algorithm for management of schizophrenia, from Fig 1 Taylor and Kerwin 1997, Fig 2 algorithm for treatment of depression from Fig 1 Pathare and Paton 1997).

The standard practice of clinical management has its disadvantages. In particular it is retro-active in that changes to patient management will occur following the emergence of therapeutic failures, adverse events or other difficulties in undertaking the therapeutic regime.

The toxicological effect of any treatment involves four main pathways, Absorption, Distribution, Metabolism and Elimination, better known as ADME. The most important axiom of toxicology is that "the dose makes the poison". Therefore variation in genes affecting the Absorption, Distribution, Metabolism and Elimination (ADME) of 'therapeutic' substances, accounts for much of the difference in individuals risk of toxicity.

Drugs interact with the body in many different ways to produce their effect. Some drugs act as false substrates of inhibitors for transport systems (e.g. calcium channels) or enzymes (acetylcholinesterase). Most drugs however, produce their effects by acting on receptors, usually located in the cell membrane, which normally respond to endogenous chemicals in the body (Weatherall, Leadingham and Warrell 1996). Drugs that activate receptors and produce a response are called agonists (e.g cholinomimetics). Antagonists combine with receptors but do not activate them, thus reducing the probability of the transmitter substance combining with the receptor and

so blocking receptor activation. The ability of the drug to interact with the receptor depends on the specificity of the drug for the receptor or 'target' (Brody, Larner and Minneman 1998).

In addition to the main categories of agonist and antagonist drugs also have mechanisms of action which include:

- blockade of uptake or transport sites (e.g selective serotonin reuptake inhibitors)
- enzyme inhibition (e.g. angiotensin convertying enzyme inhibitors, acetylcholinesterase inhibitors)
- blockade of ion channels (calcium channel antagonists, anaesthetics)

Any drug may produce unwanted or unexpected adverse events, these can range from trivial (slight nausea) to fatal (aplastic anaemia). According to a recent article published in JAMA (Lazarou J, Pomeranz BH, Corey PN. 1998. Incidence of adverse drug reactions in hospitalised patients: a meta-analysis of prospective studies. JAMA Apr 15; 279 (15): 1200-5), in 1994, in US, 106,000 deaths were caused by adverse drug reactions, making ADRs the fourth leading cause of death in US. One of the main reasons for adverse events following drug intake is the drug binding to nonspecific or non-target receptors in the body (Brody, Larner and Minneman 1998). Another reason is the interaction of the drug with other drugs given to the patient. This is a particular problem in the elderly who frequently suffer from multiple illnesses requiring many different classes of drugs and providing a real potential for drug interactions (Weatheral, Leadingham and Warrell 1996). The drug may also produce adverse events over time as the drug is absorbed, distributed, metabolised and excreted e.g. products of metabolising the drug may be reactive themselves and be toxic to the body. Being able to predicting the likelihood of particular individuals suffering from an adverse event and the severity of that event would be important tool for the practitioner.

Another problem the medical practitioner faces, is that certain patients may be particularly susceptible to drug addiction. Examples of drugs with known addictive properties are Amphetamines, Temazepam and Phenobarbitone, although having approved medicinal use e.g. phenobarbitone for epilepsy, they may cause problems of dependency and misuse in individuals. Knowledge of such an individual's susceptibility before prescribing certain drugs would be an advantage to the medical practitioner.

The core list of genes for the ADME Genostic, would prove of considerable value in aiding decisions concerning the appropriateness and relevance of therapeutic interventions using many drugs. The use of the ADME Genostic would be of considerable utility in determining the likelihood and magnitude of therapeutic response, complications from drug-drug interactions, the potential for adverse events and the difficulties that might arise due to previous, concurrent or future dysfunction, damage or disease of body systems in an individual, patient, group or population. All of these factors are of considerable importance in enabling the selection and monitoring of therapeutic interventions and effective healthcare management.

In addition, the core list of genes in the ADME genostic would also be of considerable

utility in enhancing the analysis of clinical trial data derived from drugs in development.

A list of drugs currently on the market can be found in standard works of reference, in particular the British National Formulary, 1998, the Dental Practioners' Formulary, 1998, Martindale, 1998, Herbal medicines, 1998. Drugs available in the United States can be found in U.S. Pharmacopeia, 1998, and drugs available in Japan can be found in Iryoyaku Nihon Iyakuhinshu, 1998, Ippanyaku Nihon Iyakuhinshu, 1998 and Hokenyaku Jiten, 1998. Drugs available in other countries can be found in the appropriate National Formularies. A list of drugs currently under development worldwide can be found in current journals and text (Pipeline pulse, 1999, Scrip, 1998, IDrugs, 1998, Current Opinion in Drug Discovery and Development, 1998).

In a recent review entitled, 'Drug-metabolism research challenges in the new millenium: individual variability in drug therapy and drug safety', it has been stated that:

"with the rapid progress in the understanding of genetic polymorphism and the development of genechip technology, it becomes quite feasible for individuals to be genotyped with respect to critical genes targeted for drug intervention and genes essential for drug transport and metabolism.....the (future) objective is to identify key genetic variations that could impact drug response and drug safety." A.Y.H. Lu, (1998) Drug metabolism and disposition, Vol 26 (12) p1217-1222.

There is a wealth of information available on the genetic polymorphisms of enzymes involved in drug metabolism. Genetic variation in genes coding for proteins which act as drug metabolising enzymes, drug transporters, DNA repair enzymes, or drug targets can lead to the production of defective enzymes or altered receptor binding affinities. This can have profound effects on the drug efficacy, drug safety and optimal drug dosage. The genetic variation in these genes has been identified and is included in our ADME core list of genes.

The following tables give examples of genes in which polymorphisms are known to be associated with variation in response to drugs.

DRUG ABSORPTION

Drug	Drug-transporter, membrane protein	Polymor phic?
All	P-glycoprotein 1 (MDR1)	1
All	P-glycoprotein 3 (MDR3)	1

DRUG DISTRIBUTION

Drug	Drug-binding plasma protein	Polymor phic?
All	Serum albumin (ALB)	1
All	Alpha 1 acid glycoprotein (AAG)	1
All	Canalicular multispecific organic anion transporter (CMOAT or MRP2)	1

Ali	Multidrug resistance associated protein (MRP1)	1
All	Cytokine-suppressive antiinflammatory drug-	1
	binding protein 1 (CSBP1)	

DRUG METABOLISM

Drug	Drug-metabolising enzyme	Polymor phic?
All	Cytochrome P450 enzymes (CYP2C19; CYP2D6)	1
All	UDP-glucuronosyltransferase	1
All	N-acetyltransferase (NAT1)	1
All	NADPH-cytochrome p450 reductase	1

DRUG ELIMINATION

Drug	Drug-excretion protein	Polymor phic?
All	Bile salt export pump (BSEP)	1
All	Sodium/bile acid cotransporter, (SLC10A1; SLC10A2)	1

DRUG TARGETS FOR CNS MARKETED DRUGS

Drug	Drug Target	Polymorphi c?
Tricyclic antidepressants	Neurotransmitter (NA/5-HT) re-uptake	√
(TCA)	proteins (NET & SERT)	
SSRIs	Selective serotonin transport re-uptake	✓
	protein (SERT)	
MAOIs	monoamine oxidase A & B	√
Benzodiazepines (GABA	GABA receptors	✓
facilitators)/GABA		·
antagonists. Barbiturates.		
Beta-blockers	Noradrenaline (beta-adrenergic)	✓
	receptors	
Atypical antidepressants	Alpha-adrenoceptors	√
Beta-adrenoceptors	Beta-adrenoceptors	
antagonists		
Dopamine blockers/ boosters	Dopamine receptors	
Dopamine blockers/	Dopamine transporter (DAT1)	√
boosters/depleters		
Anticholinergics (muscarinic	Muscarinic receptors	√
antagonists)		
Anticholinergics	Nicotinic receptors	√
(nicotinic antagonists)		
Anticholinesterases	Acetylcholinesterase (ACHE)	√
COMT inhibitor	Catechol-O-methyltransferase	1
	(COMT)	
Sodium channel blocker	Sodium channel	√

Opioid analgesics & antagonists	Opioid receptors (OPRM1; OPRK1; OPRD1)	1
Antipsychotics/neuroleptics (5-HT/D2 antagonists)	5-HT/D2 receptors	√
Antiinflammatory drugs	Cyclooxygenase (COX1, COX2)	1
Antihistamines	Histamine receptors	1

DRUG TARGETS FOR CNS DRUGS IN DEVELOPMENT

Drug	Drug Target	Polymor phic?
Selective NAT inhibitors (SNRIs)	Noradrenaline transport reuptake protein (NAT1 or NET)	1
5-HT1A-agonist	5-HT1A receptor (HTR1A)	1
Selective 5-HT2A antagonist	5-HT2A receptor (HTR2A)	1
Clozapine (MAOI)	5-HT2C receptor (HTR2C)	1
Glycine antagonist	Glycine receptor (GLRA2)	1
Cannabinoid receptor agonist (THC)	Cannabinoid receptor (CNR1)	1
Calcium channel blocker	Calcium channels	1

DRUG TARGETS FOR CARDIOVASCULAR MARKETED DRUGS

Drug	Drug Target	Polymor phic?
ACE inhibitors	Angiotensin converting enzyme (ACE)	1
HMG CoA reductase inhibitors, e.g simvastatin	HMG CoA reductase	1
Angiotensin II antagonists	Angiotensinogen (AGT)	1
Calcium channel blocker	Calcium channel	1
Thromboxane A2 synthase inhibitor	Thromboxane A2 synthase	1
A2 receptor antagonist	Thromboxane A2 receptor	1
Potassium channel blocker	Potassium channel	1
Na-H ion exchange (NHE) inhibitor	Na-H ion exchanger (NHE)	-
bile acid transport inhibitor	SLC10A1 (sodium/bile acid cotransporter)	1
bile acid transport inhibitor	SLC10A2 (sodium/bile acid cotransporter)	1
platelet aggregation inhibitor	Von Willebrand factor	1
ACAT inhibitor	Acetoacetyl-CoA-thiolase (ACAT)	1
Endothelin antagonist	Endothelin (EDN3)	1

DRUG TARGETS FOR GASTROINTESTINAL DISEASE (Peptic ulcer) MARKETED DRUGS

Drug	Drug Target	Polymor
		phic?

Proton pump inhibitor (e.g	H+/K+ adenosine triphosphatase (ATPase)	1
omeprazole).	enzyme system ('proton pump')	
H2 antagonists	Histamine H2-receptor	√
(e.g.cimetidine)		
Muscarinic antagonists	Muscarinic m1 & m3 receptors	√
(e.g.pirenepine)		
Prostaglandins (inhibit	Adenylate cyclase, histamine-induced	√
cAMP)	activity	

DRUG TARGETS FOR RESPIRATORY DISEASE (Asthma & Allergy) MARKETED DRUGS

Drug	Drug Target	Polymor phic?
Beta-2- agonists (Bronchiodilators)	Beta-2-adrenoceptor	1
Muscarinic antagonists (Bronchiodilators)	Muscarinic receptors	√
Histamine antagonists (Antihistamines)	Histamine receptors	√
Thromboxane A2 synthase inhibitor	Thromboxane A2 synthase	√
A2 receptor antagonist	Thromboxane A2 receptor	√

DNA REPAIR

Drug	DNA repair enzyme	Polymor phic?
All	O(6)-methylguanine-DNA methyltransferase (MGMT)	1
All	DNA damage binding protein (DDB1)	1
All	. DNA-damage-inducible transcript 3 (DDIT3)	1
All	RAD52	√

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

ADME GENE LIST	HUGO gene symbol	Protein function
5-adenosyl homocysteine hydrolase	- ,	E
Acetoacetyl 1-CoA-thiolase	ACAT1	Ē
Acetoacetyl 2-CoA-thiolase	ACAT2	Ē
Acetyl CoA acyltransferase	ACAA	Ē
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	1
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N N
Acetylcholine receptor, nicotinic, beta 2	CHRNB3	N N
Acetylcholine receptor, nicotinic, beta 3	CHRNB4	
Acetylcholine receptor, nicotinic, epsilon	CHRNE CHRNE	N
Acetylcholine receptor, nicotinic, epsilon Acetylcholine receptor, nicotinic, gamma	CHRNG	N
A set delegit sectores	ACHE	N
Actin, alpha, cardiac	ACTC	E
Actin, alpha, skeletal	ACTA1	· S
Actin, alpha, smooth, aortic	ACTA1	S
Actin, beta	ACTAZ	8
Actin, gamma 2	ACTG2	S S S S E
Acyl CoA dehydrogenase, short chain	ACADS	٥
Adenine phosphoribosyltransferase	APRT	T
Adenosine deaminase	ADA	
Adenosine dearninase Adenosine monophosphate deaminase	AMPD	E
Adenosine receptor A1	ADORA1	E
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORAZA ADORA2B	. N
Adenosine receptor A3	ADORA2B ADORA3	N
Adenylate cyclase 1	ADOKAS ADCY1	N
Adenylate cyclase 2		E
Adenylate cyclase 3	ADCY2	E
Adenylate cyclase 4	ADCY4	E
Adenylate cyclase 5	ADCY4	E
Adenylate cyclase 6	ADCY5	E
•	ADCY6	E
Adenylate cyclese 7	ADCY7	E
Adenylate cyclase 8	ADCY8	E
Adenylate cyclase 9	ADCY9	E
Adenylate kinase	AK1	E
Adenylate transferase	4 D.O.I.	E
Adenylosuccinate lyase	ADSL	E
ADP-ribosyltransferase	ADPRT	E
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N

Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH)	ADRB1 ADRB2 ADRB3 ACTHR	N N N G
receptor	AL D	_
Adrenoleukodystrophy gene	ALD	E
Albumin, ALB	ALB AKU	T
Alpha 1 anid glycoprotein	AAG; AGP	G
Alpha 1 acid glycoprotein alpha1-antitrypsin	PI	T
alpha2-antiplasmin	PLI	E
alpha-amylase	, .	E
Alpha-fetoprotein	AFP	G
alpha-glucosidase, neutral AB	GANAB	E
alpha-glucosidase, neutral C	GANC	E
Aminomethyltransferase	AMT	E
Aminopeptidase P	XPNPEP2	E
Amyloid beta (A4) precursor protein-binding,	APBB1	N
APBB1	, 55 .	• •
Amyloid beta A4 precursor protein	APP	Ν
Androgen binding protein	ABP	T
Androgen receptor	AR	Ġ
Angiotensin converting enzyme	ACE, DCP1	
Angiotensin receptor 1	AGTR1	E
Angiotensin receptor 2	AGTR2	T
Angiotensinogen	AGT	Ε
Annexin 1	ANX 1	ì
Apurinic endonuclease	APE	Ε
Arginine vasopressin	AVP	Ν
Arginine vasopressin receptor 1A	AVPR1A	Ν
Arginine vasopressin receptor 1B	AVPR1B	Ν
Arginine vasopressin receptor 2	AVPR2	Ν
Aryl hydrocarbon receptor	AHR	T
Arylsulfatase E	ARSE	Ε
Aspartate transcarbamoylase		E
Ataxia telangiectasia gene, AT	ATM	G
ATP cobalamin adenoxyltransferase		E
ATP sulphurylase	atpsk2	E
ATP/ADP translocase	4.15	E
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
BCL2-associated X protein	BAX	G
Benzodiazepine receptor		N
beta-endorphin receptor	DAAT	N
Bile acid coenzyme A: amino acid N-acyltransferase	BAAT	Ε

Bile salt export pump	BSEP, PFIC2	Т
Bile salt-stimulated lipase	CEL	E
Bilirubin UDP-glucuronosyltransferase		Ε
Biliverdin reductase		Т
Bleomycin hydrolase	BLMH	Ε
Bradykinin receptor B1		ī
Bradykinin receptor B2		i
Breakpoint cluster region	BCR	G
Breast cancer 1	BRCA1	G
Breast cancer 2	BRCA2	G
Brush border guanylyl cyclase		E
Butyrylcholinesterase	BCHE	E
Ca(2+) transporting ATPase, fast twitch	ATP2A1	T
Ca(2+) transporting ATPase, slow twitch	ATP2A2	Ť
Calcineurin A1	CALNA1	i
Calcineurin A2	CALNA2	i
Calcineurin A3	CALNA3	i
Calcineurin B		i
Calcitonin receptor /Calcitonin gene-related	CALCR	Ň
peptide receptor		• •
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	Ν
subunit		•
Calcium channel, voltage-dependent, Alpha-	CACNA1B	Ν
1B (CACNL1A5)		•
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C		
Calcium channel, voltage-dependent, Alpha-	CACNA1D	Ν
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	Ν
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	Ν
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	N
Calcium channel, voltage-dependent, Beta 3	CACNB3	Ν
Calcium channel, voltage-dependent, L type,	CACNA1S	Ν
alpha 1S subunit		
Calcium channel, voltage-dependent,	CACNG2	Ν
Neuronal, Gamma		
Calcium channel, voltage-dependent, P/Q	CACNA1A	Ν
type, alpha 1A subunit		
Calcium channel, voltage-dependent, T-type		Ν
Canalicular multispecific organic anion	CMOAT	Т
transporter	•	
Cannabinoid receptor	CNR1	Ν
Carbamoylphosphate synthetase 1	CPS1	E
Carbamoyiphosphate synthetase 2	CPS2	E
Carbonic anhydrase 3	CA3	Ē
Carbonic anhydrase 4	CA4	E
·		_

Carbonic anhydrase, alpha	CA1	Ε
Carbonic anhydrase, beta	CA2	E
Carnitine transporter protein	CDSP, SCD	T
Carnosinase	0.000	N
Cartilage-hair hypoplasia gene	CHH	N
Catalase	CAT	1
Catechol-O-methyltransferase	COMT	Ė
Catenin, beta	CTNNB1	G
Cell adhesion molecule, vascular, VCAM	VCAM1	G
Cholecystokinin	CCK	N
Cholecystokinin B receptor	CCKBR	N
Cholesterol ester transfer protein	CETP	T
Choline acetyltransferase	CHAT	Ė
CoA transferase	OHAT	E
Colony-stimulating factor 1	CSF1	G
Colony-stimulating factor 2	CSF2	G
Colony-stimulating factor 3	CSF3	G
Colony-stimulating factor 3 receptor	CSF3R	G
Complex V	MTATP6	E
Coproporphyrinogen oxidase	CPO	E
Cortico-steroid binding protein	CFO	T
Corticosteroid nuclear receptor		ŀ
Corticosteroid nuclear receptor Corticotrophin-releasing hormone receptor	CRHR1	-
Creb binding protein	CREBBP	T
Crystallin, alpha A	CRYAA	G
Crystallin, alpha B	CRYAB	S S
Crystallin, beta B2		S
Crystallin, gamma A	CRYBB2 CRYGA	S
Cu2+ transporting ATPase alpha polypeptide	ATP7A	E
Cu2+ transporting ATP ase alpha polypeptide	ATP7B	E
Cyclic AMP response element binding protein	CREB	G
- · · · · · · · · · · · · · · · · · · ·	CREM	G
Cyclic AMP-dependent protein kinase	PKA	E
Cyclic nucleotide phosphodiesterase 1B	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	E
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	
Cyclic nucleotide phosphodiesterase 2A	PDE3A	E
Cyclic nucleotide phosphodiesterase 3B		E
Cyclic nucleotide phosphodiesterase 4A	PDE4A	E
Cyclic nucleotide phosphodiesterase 4C	PDE4C	E
Cyclic nucleotide phosphodiesterase 4C	· · · -	
Cyclic nucleotide phosphodiesterase 6A	PDE5A	E
Cyclic nucleotide phosphodiesterase 6B	PDE6A	E
Cyclic nucleotide phosphodiesterase 7	PDE6B	E
	PDE7	E
Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A	PDE8	E
Cyclic nucleotide priospriodiesterase 9A Cyclin F	PDE9A	E
Cyclin r Cyclin-dependent kinase inhibitor 1A (P21,	CONF	G
Cyonn-dependent kniase inhibitor TA (P21,	CDKN1A	G

CIP1)		
·	COX1	Е
Cyclooxygenase 1	COX1	E
Cyclooxygenase 2	COAZ	
Cyclophilin	CVD44A4	[
CYP11A1	CYP11A1	E
CYP11B1	CYP11B1	E
CYP11B2	CYP11B2	E
CYP17	CYP17	E
CYP19	CYP19	Ε
CYP1A1	CYP1A1	E
CYP1A2	CYP1A2	E
CYP1B1	CYP1B1	E
CYP21	CYP21	E
CYP24	CYP24	Ε
CYP27	CYP27	E
CYP27B1	PDDR	E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	Ε
CYP2A6V2	CYP2A6V2	Е
CYP2A7	CYP2A7	. Е
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	E
CYP2C19	CYP2C19	Ē
CYP2C8	CYP2C8	Ē
CYP2C9	CYP2C9	Ē
CYP2D6	CYP2D6	Æ
CYP2E1	CYP2E1	Ē
CYP2F1	CYP2F1	Ē
CYP2J2	CYP2J2	
CYP3A3	CYP3A3	E
CYP3A4	CYP3A4	Ē
CYP3A5	CYP3A5	Ē
CYP3A7	CYP3A7	Ē
CYP4A11	CYP4A11	Ē
CYP4B1	CYP4B1	Ē
CYP4F2	CYP4F2	Ē
CYP4F3	CYP4F3	Ē
CYP51	CYP51	Ē
CYP5A1	CYP5A1	Ē
CYP7A	CYP7A	Ē
CYP8	CYP8	Ē
Cystic fibrosis transmembrane conductance	CFTR	N
regulator, CFTR	OI III	14
•	CDA	Ε
Cytidine deaminase	CTPS	E
Cytidine-5-prime-triphosphate synthetase	CSBP1	-
Cytokine-suppressive antiinflammatory drug-	CODET	•
binding protein 1		

Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2	Ì
Deoxycytidine kinase DCK		_
Deoxyuridine triphosphatase; dUTPase		E
DHEA sulfotransferase	STD	E
Dihydrodiol dehydrogenase 1	DDH1	E
Dihydrofolate reductase	DHFR	E
Dihydrolipoamide branched chain transacylase		N
Dihydrolipoamide dehydrogenase	DLD	
Dihydrolipoyl dehydrogenase 2	PDHA	N E
Dihydrolipoyl transacetylase	PDHA	E
Dihydroorotase		E
Dihyropyrimidine dehydrogenase	DPYD	E
Disrupted meiotic cDNA 1, homolog	DMC1	G
DNA damage binding protein, DDB1	DDB1	S
DNA damage binding protein, DDB2	DDB2	S
DNA directed polymerase, alpha	POLA	E
DNA glycosylases	IOLA	E
DNA helicases		E
DNA Ligase 1	LIG1	E
DNA methyltransferase	DNMT	E
DNA polymerase 1		E
DNA polymerase 2		E
DNA polymerase 3		E
DNA primase		E
DNA-damage-inducible transcript 3	DDIT3	S
DNA-dependant RNA polymerase	223	E
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	N
Dopamine receptors D5	DRD5	N
Erythropoietin	EPO	ì
Erythropoietin receptor	EPOR	i
Estrogen receptor	ESR	Ġ
Excision repair complementation group 1	ERCC1	Ē
protein		
Excision repair complementation group 2	ERCC2	Ε
protein		
Excision repair complementation group 2	ERCC3	Ε
protein		
Excision repair complementation group 4	ERCC4	Ε
protein		
	ERCC6	Ε
protein		٠
	HF1	1
	F9	1
Factor VII	F7	1

	•	
Factor VIII	F8	1
Factor X	F10	l
Fatty acid binding proteins FABP1		Τ
Fatty acid binding proteins FABP2	FABP2	T
Fatty acid binding proteins FABP3	·	T
Fatty acid binding proteins FABP4		T
Fatty acid binding proteins FABP5		Т
Fatty acid binding proteins FABP6		Т
Fibroblast growth factor	FGF1	G
Flavin-containing monooxygenase 1	FMO1	Ε
Flavin-containing monooxygenase 2	FMO2	E
Flavin-containing monooxygenase 3	FMO3	E
Flavin-containing monooxygenase 4	FMO4	Ε
Folic acid receptor	FOLR	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Forkhead transcription factor 10	FKHL10	G
Forkhead transcription factor 14	FKHL14	G
Forkhead transcription factor 7	FKHL7	G
G/T mismatch binding protein	GTBP, MSH6	G
GABA receptor, alpha 1	GABRA1	N
GABA receptor, alpha 2	GABRA2	Ν
GABA receptor, alpha 3	GABRA3	Ν
GABA receptor, alpha 4	GABRA4	Ν
GABA receptor, alpha 5	GABRA5	Ν
GABA receptor, alpha 6	GABRA6	Ν
GABA receptor, beta 1	GABRB1	Ν
GABA receptor, beta 2	GABRB2	Ν
GABA receptor, beta 3	GABRB3	Ν
GABA receptor, gamma 1	GABRG1	N
GABA receptor, gamma 2	GABRG2	Ν
GABA receptor, gamma 3	GABRG3	Ν
GABA transaminase	ABAT	Ε
Gadd45 (growth arrest & DNA-damage-inducib	le protein)	Ε
Galactose 1-phosphate uridyl-transferase	GALT	Ε
Gamma-glutamyl carboxylase	GGCX	T
Gamma-glutamyltransferase 1	GGT1	T
Gamma-glutamyltransferase 2	GGT2	Т
Gastric inhibitory polypeptide receptor, GIPR	GIPR	T
Gastric lipase, LIPF	•	Т
Glucagon receptor	GCGR	G
Glucocorticoid receptor	GRL	G
Glucosaminyl (N-acetyl) transferase 2, I-	GCNT2	E
branching enzyme		_
Glucosidase, acid beta	GBA	E
Glutamate decarboxylase, GAD	GAD1	E
Glutamate receptor 1	GLUR1	N
Glutamate receptor 2	GLUR2	Ν

Glutamate receptor 3	GLUR3	Ν
Glutamate receptor 4	GLUR4	N
Glutamate receptor 5	GLUR5	Ν
Glutamate receptor 6	GLUR6	Ν
Glutamate receptor 7	GLUR7	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	Ν
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
Glutamine phosphoribosylpyrophosphate amid-		E
amidotransferase		_
Glutathione	GSH	Т
Glutathione peroxidase, GPX1	GPX1	Ε
Glutathione peroxidase, GPX2	GPX2	Ē
Glutathione reductase, GSR	GSR	Ε
Glutathione S-transferase mu 1, GSTM1	GSTM1	Ε
Glutathione S-transferase mu 4, GSTM4		Ε
Glutathione S-transferase theta 1, GSTT1	GSTT1	E
Glutathione S-transferase theta 2, GSTT2		Ε
Glutathione S-transferase, GSTP1	GSTP1	Ε
Glutathione S-transferase, GSTZ1	GSTZ1	Ε
Glutathione synthetase	GSS	Ε
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	Ε
GAPDH		
Glycinamide ribonucleotide (GAR)	GART	Ε
transformylase		
Glycine receptor, alpha	GLRA2	Ν
Glycine receptor, beta		Ν
Glycine transporter	GLYT	Ν
Gonadotropin releasing hormone	GNRH	G
Gonadotropin releasing hormone receptor	GNRHR	G
Growth arrest-specific homeobox	GAX	G
Growth hormone 1	GH1	G
Growth hormone 2 (placental)	GH2	G
Growth hormone receptor	GHR	G
Growth hormone releasing hormone (GHRH)	GHRH	G
Growth hormone releasing hormone receptor	GHRHR	G
GTP cylcohydrolase 1	GCH1	G
GTPase-activating protein, GAP	RASA1	G
Guanidinoacetate N-methyltransferase	GAMT	Ε
Guanine nucleotide-binding protein, alpha	GNAO1	Ν
activating activity polypeptide, GNAO		
Guanine nucleotide-binding protein, alpha	GNAI1	N
inhibiting activity polypeptide 1, GNAI1		
Guanine nucleotide-binding protein, alpha	GNAI2	N
inhibiting activity polypeptide 2, GNAI2		
Guanine nucleotide-binding protein, alpha	GNAI3	Ν

inhibiting activity polypeptide 3, GNAI3	· • • • • • • • • • • • • • • • • • • •	
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	Ν
Guanine nucleotide-binding protein, alpha	GNAS2	Ν
stimulating activity polypeptide, GNAS2	J. 11 (1)	•
Guanine nucleotide-binding protein, alpha	GNAS3	Ν
stimulating activity polypeptide, GNAS3		
Guanine nucleotide-binding protein, alpha	GNAS4	Ν
stimulating activity polypeptide, GNAS4		
Guanine nucleotide-binding protein, alpha	GNAT1	Ν
transducing activity polypeptide, GNAT1	CNIATO	
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	N
Guanine nucleotide-binding protein, beta	GNB3	N
polypeptide 3	GNBS	IN
Guanine nucleotide-binding protein, gamma	GNG5	Ν
polypeptide 5		• •
Guanine nucleotide-binding protein, q	GNAQ	Ν
polypeptide	• .	
Guanylate cyclase 2D, membrane (retina-	GUCY2D	Ε
specific)		_
Guanylate cyclase activator 1A (retina)	GUCA1A	E
Guanylate kinase	GUCA2	E
Guanylin Guanylyl cyclase	GUCAZ	T E
H(+), K(+) - ATPase	ATP4B	N
Heat shock protein, HSP60	All 4b	IN I
Heat shock protein, HSP70		i
Heat shock protein, HSP90	•	1
Hemopexin	HPX	i
Hepatic lipase	LIPC	Ė
Histamine receptors, H1	,	N
Histamine receptors, H2		Ν
Histamine receptors, H3		Ν
HLH transcription factor HAND1	HAND1	G
HLH transcription factor HAND2	HAND2	G
HMG-CoA lyase	HMGCL	E E
HMG-CoA reductase	HMGCR	E
HMG-CoA synthase	HMGCS2	Ε
Hormone-sensitive lipase	HSL	E
HSSB, replication protein		E
Hypoxanthine-guanine	HPRT	Ε
phosphoribosyltransferase, HGPRT		
Ibonucleoside diphosphate reductase		Ε
Ikaros gene	IKAROS	G
Inosine monophosphate dehydrogenase,		E
IMPDH		
Inosine triphosphatase	ITPA	E

Inositol monophosphatase	IMPA1	N1
Insulin	INS	N G
Insulin receptor	INSR	
Insulin-like growth factor 1 receptor	IGF1R	G G
Insulin-like growth factor 2 receptor	IGF2R	G
Interferon alpha	IFNA1	١
Interferon beta	IFNB	. 1
Interferon gamma	IFNG	. 1
Interferon gamma receptor 1	IFNGR1	1
Interferon gamma receptor 2	IFNGR1	I .
Interferon regulatory factor 1	IRF1	1
Interferon regulatory factor 4	IRF4	
Interleukin(IL) 1 receptor	IL1R	1
Interleukin(IL) 1, alpha	IL1A	1
Interleukin(IL) 1, aipria	IL1B	1
Interleukin(IL) 10	IL10	
Interleukin(IL) 10 receptor	IL10	1
Interleukin(IL) 11	IL11	1
Interleukin(IL) 11 receptor	IL11R	1
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	. 1
Interleukin(IL) 13	IL13	· I
Interleukin(IL) 13 receptor	IL13R	i
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	
Interleukin(IL) 2 receptor, gamma	IL2RG	: 1
Interleukin(IL) 3	IL3	i
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	i
Interleukin(IL) 4 receptor	IL4R	i
Interleukin(IL) 5	IL5	
Interleukin(IL) 5 receptor	IL5R	i
Interleukin(IL) 6	IL6	i
Interleukin(IL) 6 receptor	IL6R	i
Interleukin(IL) 7	IL7	i
Interleukin(IL) 7 receptor	IL7R	i
Interleukin(IL) 8	IL8	i
Interleukin(IL) 8 receptor	IL8R	Ī
Interleukin(IL) 9	IL9	i
Interleukin(IL) 9 receptor	IL9R	í
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	i
Kallikrein 3	KAK3	i
Kinectin	KTN1	Ġ
Kinesin, heavy chain	KNSL1	G
Kinesin, light chain	KNS2	G
Kininogen, High molecular weight	KNG	1
Leptin	LEP	Ġ
Leptin receptor	LEPR	G
-ahmi i aaahia.		9

A A A A A A A A A A A A A A A A A A A		1
Leukotriene A4 hydrolase		1
Leukotriene B4 receptor		i
Leukotriene C4 receptor		i
Leukotriene D4/E4 receptor	LHCGR	Ġ
E1 1101101109011440114	LMX1B	G
Ellis Homoopox a another in the state of a second	LPL	1
Lipoprotopage	LDLR	Ť
Eipopiotoii: resopter; Terri = errers;	LOG12	1
Liboxygotiago iz (biateroto)	LOGIZ	1
Lipoxygenase 5 (leukocytes)	1.00	Ť
Low density lipoprotein receptor-related protein	LKF	1
precursor	LIPA	_
Lysosoma, asia mpass	LIPA	E
Malonyi CoA decarboxylase		E
Malonyl CoA transferase		E
Maltase-glucoamylase	MDD	1
Mannose binding protein	MBP	· T
Mannosyl (alpha-1,6-)-glycoprotein beta-1, 2-	MGAT2	١
N-acetylglucosaminyltransferase	NAADKKA NAEKA	0
MAPK kinase 1	MAPKK1; MEK1 MAPKK4; MEK4;	G G
MAPK kinase 4	SERK1	G
	MAPKK6; MEK6	G
MAPK kinase 6	MAPKKK	G
MAPKK kinase	MGP	G
Matrix Gla protein	WGI	E
MEK kinase, MEKK	MC2R	Ŧ
Melanocortin 2 receptor	MC4R	Ť
Melanocortin 4 receptor Methionine adenosyltransferase	MAT1A, MAT2A	Ė
Methionine synthase	MTR	Ē
Methionine synthase reductase	MTRR	E
Methylguanine-DNA methyltransferase	MGMT	Ē
Mevalonate kinase	MVK	Ē
MHC Class I: Tap1	ABCR, TAP1	Ī
MHC Class II: Tap2	TAP2, PSF2	i
Microphthalmia-associated transcription factor	MITF	G
Mismatch repair gene, PMSL1	PMS1	Ğ
Mismatch repair gene, PMSL2	PMS2	G
Mitochondrial trifunctional protein, alpha	HADHA	E
subunit		
Mitochondrial trifunctional protein, beta subunit	HADHB	Ε
Mitogen-activated protein (MAP) kinase	MAPK	G
Monoamine oxidase A	MAOA	Ε
Monoamine oxidase B	MAOB	Ε
Multidrug resistance associated protein	MRP	G
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	Ν
Muscarinic receptor, M3	CHRM3	Ν
· · · · · · · · · · · · · · · · · · ·		

•		
Muscarinic receptor, M4 Muscarinic receptor, M5 Na+, K+ ATPase, alpha Na+, K+ ATPase, beta 1 Na+, K+ ATPase, beta 2 Na+, K+ ATPase, beta 3 Na+/H+ exchanger 1 Na+/H+ exchanger 2 Na+/H+ exchanger 3 Na+/H+ exchanger 4 Na+/H+ exchanger 5 N-acetylgalactosamine-6-sulfate sulfatase N-acetylglucosaminidase, alpha N-acetyltransferase 1 N-acetyltransferase 2 N-acyl hydrolase	CHRM4 CHRM5 ATP1A1 ATP1B1 ATP1B2 ATP1B3 NHE1 NHE2 NHE3 NHE4 NHE5 GALNS GNS NAGLU NAT1 NAT2	NNGGGGTTTTTEEEEI
NADH dehydrogenase (ubiquinone)	NDUFV1	Ε
flavoprotein 1	5 14.4	
NADRH dependent sides by PASS	DIA1	E
NADPH-dependent cytochrome P450 reductase	POR	E
Nephrolithiasis 2	NPHL2	Т
Nephronophthisis 2	NPHP2	† †
Nephrosis 1	NPHS1	Ť
Neuroendocrine convertase 1	NEC1, PCSK1	. E
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	Ν
Neuropeptide Y receptor Y2	NPY2R	N
Niacin receptor		G
Niemann-Pick disease protein	NPC1	Т
Nuclear factor kappa beta	NFKB	I
Nuclear factor of activated T cells (NFAT)	NFATC	G
complex, cytosolic	\	
Nuclear factor of activated T cells (NFAT)	NFATP	G
complex, preexisting component Nucleoside diphosphate kinase-A	NDDIZA	· -
Oncogene spi1	NDPKA	E
Opioid receptor, delta	OPRD1	G N
Opioid receptor, kappa	OPRK1	N
Opioid receptor, mu	OPRM1	N
Ornithine transcarbamoylase	OTC, NME1	E
Osteoprotegerin	OPG	G
Otoferlin	OTOF	N
Oxytocin	OXT	N
Oxytocin receptor	OXTR	· N

Paired-like homeodomain transcription factor 2 Paired-like homeodomain transcription factor 3 Paraoxonase PON1		G G E
Paraoxonase PON1 Paraoxonase PON2	PON2	E
Paraoxonase PON3	1 0142	E
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	Ğ
Parathyroid hormone-like hormone	PTHLH	Ğ
Parvalbumin	PVALB	G
PCNA (proliferating cell nuclear antigen)		Ε
Peanut-like 1	PNUTL1	1
Peroxisomal membrane protein 1	PXMP1	S
Peroxisome biogenesis factor 1	PEX1	Т
Peroxisome biogenesis factor 19	PEX19	Т
Peroxisome biogenesis factor 6	PEX6	Т
Peroxisome biogenesis factor 7	PEX7	T
Peroxisome proliferative activated receptor,	PPARA	Ť
alpha	•	
Peroxisome proliferative activated receptor,	PPARG	T
gamma		
P-glycoprotein 1	PGY1	T
P-glycoprotein 3	PGY3	T
Phenylethanolamine N-methyltransferase,	PNMT	Ε
PNMT		_
Phosphodiesterase 1 / nucleotide	PDNP1	G
pyrophosphatase 1	551156	_
Phosphodiesterase 1 / nucleotide	PDNP2	G
pyrophosphatase 2	PPNDO	_
Phosphodiesterase 1 / nucleotide	PDNP3	G
pyrophosphatase 3	DI 40040	
Phospholipase A2, group 10	PLA2G10	ı
Phospholipase A2, group 1B	PLA2G1B	
Phospholipase A2, group 2A	PLA2G2A	ı,
Phospholipase A2, group 2B	PLA2G2B	1
Phospholipase A2, group 4A	PLA2G4A	1
Phospholipase A2, group 4C	PLA2G4C	1
Phospholipase A2, group 5	PLA2G5 PLA2G6	1
Phospholipase A2, group 6	PLAZGO	1
Phospholipase C alpha	•	1
Phospholipase C beta	PLCD1	¦
Phospholipase C delta	PLODI	1
Phospholipase C epsilon	PLCG1	1
Phospholipase C gamma Phosphomannomutase-2	PMM2	Ť
Phosphomannose isomerase-1, PMI1	MPI	T
Phosphoribosyl pyrophosphate synthetase	PRPS1	E
Pituitary adenylate cyclase activating peptide	PACAP	N
i itulially adelitylate cyclase activating peptide	IAVAI	i V

Pituitary adenylate cyclase activating peptide receptor	PACAP1R	N
Plasminogen activator, Tissue	PLAT; TPA	Е
Platelet-activating factor receptor	PAFR	
Plectin 1	PLEC1	T
Polycystin 1	PKD1	
Polycystin 2	PKD2	T.
Porphobilinogen deaminase	HMBS	Ţ
Potassium channel, calcium-activated,	KCNN4	E
Potassium channel, subfamily K, member 1	KCNK1	N
Potassium channel, subfamily K, member 2		N
Potassium channel, subfamily K, member 3	KCNK2	N
· · · · · · · · · · · · · · · · · · ·	KCNK3	N
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1	N
Potassium voltage-gated channel E1	KCNE1	. N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	N
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)	***	
POU domain, class 3, transcription factor 4	POU3F4	G
POU domain, class 4, transcription factor 3	POU4F3	G
Pre-B-cell leukemia transcription factor 1	PBX1	G
Preproglucagon	GCG;GLP1; GLP2	G
Progesterone receptor (RU486 binding	PGR	G
receptor)		
Prolactin	PRL	G
Prolactin receptor	PRLR	G
Proopiomelanocortin	POMC	Ν
Prostacyclin synthase		1
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	1
Prostaglandin D - DP receptor		1
Prostaglandin E1 receptor		. 1
Prostaglandin E2 receptor		F
Prostaglandin E3 receptor		I
Prostaglandin F - FP receptor		I
Prostaglandin F2 alpha receptor		i
Prostaglandin IP receptor		. 1
Prostaglandin-endoperoxidase synthase 2	PTGS2	G
Protease nexin 2	PN2	Ε
Protein C	PROC	1
Protein kinase DNA-activated	PRKDC	Е
Protein S	PROS1	1
Pterin-4-alpha-carbinolamine	PCBD	
Purine nucleoside phosphorylase	NP	Ε
Purinergic receptor P1A1		N
Purinergic receptor P1A2		N

Purinergic receptor P1A3		N
Purinergic receptor P2X, 1	P2RX1	N
Purinergic receptor P2X, 2	P2RX2	N
Purinergic receptor P2X, 3	P2RX3	N
Purinergic receptor P2X, 4	P2RX4	N
Purinergic receptor P2X, 5	P2RX5	N
Purinergic receptor P2X, 6	P2RX6	N
Purinergic receptor P2X, 7	P2RX7	N
Purinergic receptor P2Y, 1	P2RY1	N
Purinergic receptor P2Y, 11	P2RY11	N
Purinergic receptor P2Y, 2	P2RY2	N
RAD51, DNA repair protein	RAD51	G
RAD52, DNA repair protein	RAD52	G
RAD54, DNA repair protein	RAD54	G
RAD55, DNA repair protein	RAD55	G
RAD57, DNA repair protein	RAD57	G
Recombination activating gene 1	RAG1	
Recombination activating gene 2	RAG2	G
Red cone pigment	RCP	G S
Replication factor A	NOF	S E
Replication factor C	RFC2	. E
Retinaldehyde binding protein 1	RLBP1	Ţ
Retinoic acid receptor, alpha	RARA	Ġ
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoid X receptor, alpha	RXRA	G
Retinoid X receptor, beta	RXRB	G
Retinoid X receptor, gamma	RXRG	G
Retinol binding protein 1		T
Retinol binding protein 2		Ť
Retinol binding protein 4	RBP4	Ť
Ribonucleotide reductase, RRM	1101 4	Ė
Ribosephosphate pyrophosphokinase	•	Ē
Ribosomal protein L13A	RPL13A	G
Ribosomal protein S19	RPS19	
Ribosomal protein S4, X-linked	RPS4X	E
Ribosomal protein S6 kinase	RPS6KA3	E
Ribosomal protein S9	RPS9	G
S-adenosylmethionine decarboxylase, AMD	111 03	E.
Secretin	SCT	T
Secretin receptor, SCTR	SCTR	÷
Serine hydroxymethyltransferase	SHMT	Ė
Serotonin N-acetyltransferase	SNAT	Ē
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N N
- 5.5.5 1000ptor, 0111 IL	1111111	IN

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Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Slug protein		G
Small nuclear ribonucleoprotein polypeptide N	SNRPN	S
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	Ν
Sodium channel, non-voltage gated 1, gamma	SCNN1G	Ν
Sodium channel, voltage gated, type IV, alpha	SCN4A	Ν
polypeptide	·	
Sodium channel, voltage gated, type V, alpha	SCN5A	Ν
polypeptide		
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		
Solute carrier family 1 (amino acid transporter),	SLC1A6	T
member 6		
Solute carrier family 1 (glial high affinity	SLC1A3	T
glutamate transporter), member 3	0.044	
Solute carrier family 1 (glutamate transporter),	SLC1A1	T
member 1	01.0440	_
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	Т
Solute carrier family 1 (neutral amino acid	CI C444	_
transporter), member 4	SLC1A4	Т
Solute carrier family 10 (sodium/bile acid	SLC10A1	—
cotransporter family),member 1	SECTOAT	T
Solute carrier family 10 (sodium/bile acid	SLC10A2	Т
cotransporter family),member 2	SEC TOAL	ı
Solute carrier family 12, member 1	SLC12A1	Т
Solute carrier family 12, member 2	SLC12A2	Ť
Solute carrier family 12, member 3	SLC12A3	Ť
Solute carrier family 14, member 2	SLC14A2	÷
A • • • • • • • • • • • • • • • • • • •	SLC15A1	Ť
transporter, intestinal), member 1	323 10, 11	•
A to the contract of the contr	SLC15A2	Т
transporter, kidney), member 2	:	1
	SLC16A1	Т
transporter), member 1		,
	SLC16A7	Т
transporter), member 7		•
	SLC17A1	Т
	SLC17A2	Ť
•	· · ·	•

Solute carrier family 18, member 3	SLC18A3	Т
Solute carrier family 19 (folate transporter), member 1	SLC19A1	T
Solute carrier family 2 (facilitated glucose	SLC2A1	Т
transporter), member 1 Solute carrier family 2 (facilitated glucose	SLC2A2	_
transporter), member 2	SLUZAZ	T
Solute carrier family 2 (facilitated glucose	SLC2A3	Т
transporter), member 3		
Solute carrier family 2 (facilitated glucose transporter), member 4	SLC2A4	Т
Solute carrier family 2 (facilitated glucose	SLC2A5	Т
transporter), member 5		•
Solute carrier family 20, member 1	SLC20A1	T
Solute carrier family 20, member 2	SLC20A2	Т
Solute carrier family 20, member 3	SLC20A3	T
Solute carrier family 21, member 2	SLC21A2	Т
Solute carrier family 21, member 3	SLC21A3	T
Solute carrier family 22, member 1	SLC22A1	Т
Solute carrier family 22, member 2	SLC22A2	T
Solute carrier family 22, member 5	SLC22A5	T
Solute carrier family 25, member 12	SLC25A12	T
Solute carrier family 3 (facilitated glucose	SLC3A1	T
transporter), member 1		
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	Т
Solute carrier family 4 (anion exchanger),	SLC4A2	Т
member 2		
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	Τ
Solute carrier family 5 (sodium/glucose	SLC5A1	Т
transporter), member 1		•
Solute carrier family 5 (sodium/glucose	SLC5A2	Ţ
transporter), member 2	•	
Solute carrier family 5 (sodium/glucose	SLC5A5	T
transporter), member 5	01.0540	_
Solute carrier family 5, member 3	SLC5A3	Ţ
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member 1	01.0040	
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	Т
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2	SECOAZ	•
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4	OLOUNT	ı
Solute carrier family 6, member 10	SLC6A10	Т
Solute carrier family 6, member 6	SLC6A6	Ť
Solute carrier family 6, member 8	SLC6A8	Ť
- control control of the the control of		'

Solute carrier family 7(amino acid transporter) member 1	, SLC7A1		Т
Solute carrier family 7(amino acid transporter) member 2	, SLC7A2		T
Solute carrier family 7(amino acid transporter) member 7	SLC7A7		Т
Solute carrier family 8 (sodium/calcium exchanger), member 1	SLC8A1		Т
Somatostatin	SST		N
Somatostatin receptor, SSTR1	SSTR1		N
Somatostatin receptor, SSTR2	SSTR2		G
Somatostatin receptor, SSTR3	SSTR3		N
Somatostatin receptor, SSTR4	SSTR4		N
Somatostatin receptor, SSTR5	SSTR5		N
Sorcin	SRI		T
SOS1 guanine nucleotide exchange factor	SOS1		Ġ
Steroid 5 alpha reductase 1	SRD5A1		E
Steroid 5 alpha reductase 2	SRD5A2		Ē
Steroid hormone receptor responsive DNA			Ğ
elements			_
Sterol carrier protein 2	SCP2	•	Т
Succinic semi-aldehyde dehydrogenase	ssadh		Ε
Sucrase			Ε
Sulfonylurea receptor	SUR		G
Synaptic vesicle amine transporter	SVAT		Ν
Tachykinin receptor, NK1R	TACR1		Ν
Tachykinin receptor, NK2R	TACR2		Ν
Tachykinin receptor, NK3R	TACR3		Ν
Terminal deoxynucleotidyltransferase	TDT		ı
Thiopurine S-methyltransferase	TPMT		Ε
Thrombopoietin	THPO		G
Thromboxane A synthase 1	TBXAS1		I
Thromboxane A2	TXA2		ļ
Thromboxane A2 receptor	TBXA2R		1
Thymidylate synthase	TYMS		E
Thymopoietin Thyroid hormone receptor, beta	TMPO		G
Thyroid-stimulating hormone receptor	THRB		G
Thyroid-stimulating hormone, alpha	TSHR		G
Thyroid-stimulating hormone, beta	TSHA		G
Topoisomerase I	TSHB		G
Topoisomerase II			E
Transcription factor 1, hepatic	TCF1		E
Transcription factor 2, hepatic	TCF1		G
Transcription factor 3	TCF3		Ģ G
Transcription factor binding to IGHM enhancer	TFE3		G
3	11 20		G
Transcription factor, TUPLE1	TUPLE1		N

Transcription termination factor, RNA	TTF1	^
polymerase 1	1 11 1-	G
Transcription termination factor, RNA	TTF2	G
polymerase 2	1112	G
Transcription termination factor, RNA	TTF3	G
polymerase 3	1110	G
Transferrin	TF	G
Transferrin receptor	TFRC	G
Transthyretin	TTR	T
Tubulin		· S
Tumour necrosis factor (TNF) receptor	TRAF1	ı
associated factor 1		•
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		•
Tumour necrosis factor (TNF) receptor	TRAF3	ı
associated factor 3		•
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4		•
Tumour necrosis factor (TNF) receptor	TRAF5	
associated factor 5		
Tumour necrosis factor (TNF) receptor	TRAF6	
associated factor 6		
Tumour necrosis factor alpha	TNFA	11
Tumour necrosis factor alpha receptor	TNFAR	l
Tumour necrosis factor beta	TNFB	I
Tumour necrosis factor beta receptor	TNFBR	I
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tumour suppresssor gene DRA	DRA	1
Ubiquitin		G
Ubiquitin activating enzyme, E1		Ε
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
Ubiquitin carboxyl-terminal esterase L1	UCHL1	G
Ubiquitin protein ligase E3A	UBE3A	E
UDP-glucose pyrophosphorylase		E
UDP-glucuronosyltransferase 1	ugt1d, UGT1	, E E E
UDP-glucuronosyltransferase 2	UGT2	E
Uncoupling protein 1		Ţ
Uncoupling protein 3	UCP3	T
Uridine monophosphate kinase	UMPK	l
Uridine monophosphate synthetase	UMPS	<u>l</u>
Uridinediphosphate(UDP)-galactose-4-	GALE	Ε.
epimerase	\	
Vimentin	VIM	l -
Vitamin B12-binding (R) protein	VOD	G
Vitamin D receptor	VDR	G
Xanthine dehydrogenase	XDH	E

Xeroderma pigmentosum, complementation group A	XPA	E
Xeroderma pigmentosum, complementation group B	XPB	E
Xeroderma pigmentosum, complementation group C	XPC	Е
Xeroderma pigmentosum, complementation group D		E
Xeroderma pigmentosum, complementation group E		E
Xeroderma pigmentosum, complementation group F	XPF	Ε.
Xeroderma pigmentosum, complementation group G	ERCC5	E
X-ray repair gene Xylitol dehydrogenase	XRCC9	G F
YY1 transcription factor	YY1	G

In a second aspect.

ONCOLOGY

The invention relates to a method of assessing the consequences, complications and the many symptoms arising as a result of developing a cancer.

Despite the fact that there are several hundred types of cancer, it is still possible to list certain general characteristics. Cancer is a cellular disorder in which cells lack the ability to grow in a controlled and organised manner. A cancer cell divides to form a growth, or tumour, that invades and destroys neighbouring healthy tissue. Tumour cells may metastasise, i.e. detach from the tumour and spread to several sites around the body. After travelling through the blood or lymph system, cancer cells are able to start proliferating to produce new tumours elsewhere. Cancers often reoccur after attempted removal of the primary tumour via this process. Malignant cancers, i.e. ones that metastasise, generally cause death of the patient, unless adequately treated. Cancer is a common disease, being the second largest cause of death after vascular disorders. Approximately 20 percent of the population of the United Kingdom will die of cancer. The most common cancers are lung, colon, breast and prostrate cancers (Weatherall, Ledingham and Warrell, 1996).

The characteristic symptoms and signs of cancer are due to the local effects of the cancer tumour infiltrating surrounding healthy tissues and causing pressure and distortion of neighbouring structures. In addition to these local site-specific symptoms, tumours produce symptoms that are, to some extent common to all cancers. These include:

- Pain.
- Weight loss.
- Tumour mass.
- Fever.
- Anaemia.
- Hypercalcaemia.

Such symptoms lead to difficulties in the clinical care of patients, difficulties in the treatment and recovery of patients and lead to stress and anxiety in their carers and families.

Causes of Cancer:

The causes of and molecular pathologies occurring in the processes leading to cancer are numerous and complicated. Identifying the molecular basis of cell transformation, i.e. the genetic changes that cause a normal cell or group of cells to lose sensitivity to the normal restraints on multiplication and thus become a tumour, has been the central issue of cancer research.

A key focus has been the mechanisms by which the loss of sensitivity to constraints on multiplication becomes a heritable and, most importantly, stable characteristic of cells and their daughter cells. Thus ensuring the development of a tumour which can continue to grow without responding to the increased cellular density and with 'no respect for the integrity of cellular architecture' (Harris 1996).

Two areas of research in the early 1980s resulted in a great step forward on the way to this objective. These were the studies of oncogenic retroviruses and of polypeptide growth factors. The simple genomes of type C retroviruses facilitated research into their mechanisms of transformation. It was found that oncogenic variants contained additional nucleic acid sequences very similar to expressed genes in mammalian cells. It rapidly became clear that these were acquired by recombination from host DNA and that their presence in the virus and their expression following infection were critical for transformation. This work on viral transformation thus identified a class of genes, now called oncogenes, present in human DNA and with the potential to transform cells when activated.

A second class of genes, tumour suppressor genes, has been identified with a different mode of action. Here inactivation of a normally active gene leads to tumour formation. Many cancers of this type have a homozygous recessive mechanism of inheritance (e.g. Wilms tumour, neurofibromatosis, familial adenomatous polyposis coli). As a result of these studies it is now appreciated that the genetic mechanism leading to tumour formation are complex and that several genetic steps might have to occur before transformation to a malignant cell phenotype is complete (Weatherall, Ledingham and Warrell, 1996).

In addition several environmental factors have a well documented carcinogenic potential such as ionizing radiation (e.g. X rays, sunshine), drugs (e.g. steroids, oestregens, cyclosporin) and chemicals used in industry and manufacturing (e.g. aromatic amines, polycyclic hydrocarbons, vinyl chloride).

Treatment of Cancer:

The unrestricted growth of a tumour causes damage to healthy tissues by occupying space (resulting in physical stresses to surrounding tissues) competing for oxygen and nutrients. From a healthcare management point of view, the most important clinical property of a tumour is its rate of growth and ability to generate secondary deposits of growth at distant sites in the body (metastasise). There is evidence that both of these factors can be related to the nature of the genetic changes within the cell and the degree of dedifferentiation expressed by the cell.

Management of cancer often involves more than one type of treatment and includes:

- Surgery
- Chemotherapy
- Radiotherapy

Local treatment frequently involves both surgery and radiotherapy in order to maximise the chances of local control.

The aim of surgical intervention is to completely excise the tumour with a margin of normal tissue around the main tumour mass. The risk of local reoccurrence is very high with a marginal excision. The aim of radiotherapy is to target the tumour mass accurately and deliver a high dose of radiation to that area in order to destroy all the tumour cells. Radiotherapy is of course toxic to normal tissue as well as malignant tissue which accounts for the side effects associated with the treatment.

Most tumours, for example breast tumours, present with locally advanced or metastatic disease, make local approaches such as surgery or radiotherapy unlikely to result in cure or long term remission. The role of these treatments therefore is primarily to prevent local reoccurrence rather than to be curative.

A growing number of cancer types respond to treatment with combination chemotherapy. Tumours such as lymphomas and leukaemias are very sensitive to anti-cancer drugs such as vincristine or cisplatin and remission of some of these cancers have been achieved in this way. There has been less success with the common solid tumours, such as lung, breast or colorectal cancer (Brody, Larner and Minnerman, 1998).

One of the difficulties in the clinical management of tumours is the cytotoxicity of many of the therapeutic agents. Severe side effects are not uncommon and include cardiac toxicity, renal impairment, pulmonary fibrosis and bone marrow suppression (British National Formulary 1998).

Further management problems arise from the specific complications which accompany the spread of metastases including spinal cord compression, carcinomatous 'meningitis', cerebral involvement, liver failure, pleural effusions, pericardial effusions and pain.

There is considerable variation in the rates of growth of the various tumours and cancers and in their propensity to metastasise. The factors are known to relate to the morphology and physiology of the original cell type and the genetic changes occurring within the transformed cell. The rates of tumour progression also vary from individual to individual and the precise factors which lie behind such individual variation are uncertain. To complicate matters there is also considerable individual

variation in the degree of toleration to the cytotoxic side effects of commonly used drugs and in the outcome of therapeutic interventions such as recovery from surgery, development of secondary infections and efficacy of pain management.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

ONCOLOGY GENE LIST	HUGO gene symbol	Protein function
Absent in melanoma 1 gene	AIM1	G
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	
Actin, alpha, smooth, aortic	ACTA2	S S
Activin	7.017.2	G
Activin A receptor, type 2B	ACVR2B	G
Activin A receptor, type 2-like kinase 1	ACVRL1	G
Adenomatous polyposis coli tumour supressor		G
gene	0	9
Adenosine deaminase	ADA	· E
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	N
Adenyl cyclase		N
Adenylate cyclase 1	ADCY1	Ē
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	Ē
Adenylate cyclase.4	ADCY4	E
Adenylate cyclase 5	ADCY5	Ē
Adenylate cyclase 6	ADCY6	E
Adenylate cyclase 7	ADCY7	E
Adenylate cyclase 8	ADCY8	E
Adenylate cyclase 9	ADCY9	E
Adrenergic receptor, alpha1	ADRA1	N .
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N

Adrenocorticotrophic hormone (ACTH) receptor	ÄCTHR	G
Albumin, ALB	ALB	_
Alcohol dehydrogenase 3	ADH3	T
• •		E
Aldehyde dehydrogenase 1	ALDH1	E
Aldehyde dehydrogenase 10	ALDH10	Ε
Aldehyde dehydrogenase 2	ALDH2	Ε
Aldehyde dehydrogenase 5	ALDH5	Ε
Aldehyde dehydrogenase 6	ALDH6	Ε
Aldehyde dehydrogenase 7	ALDH7	Ε
Aldosterone receptor	MLR	G
alpha tectorin	TECTA	G
alpha1-antitrypsin	PI	E
alpha-actinin 2	ACTN2	G
alpha-actinin 3		Ğ
Alpha-fetoprotein		G
alpha-synuclein		N
Amphiregulin		G
Amyloid beta A4 precursor protein		
Amyloid beta A4 precursor-like protein		N
The state of the s		N
Androgen receptor		G
Angiopoietin 1		G
Angiopoietin 2		G
Angiotensin converting enzyme	ACE, DCP1	Е
Angiotensin receptor 1		Т
Angiotensin receptor 2		T
Angiotensinogen	AGT	Ε
Annexin 1	ANX 1	1
Antidiuretic hormone receptor	ADHR	T
Antithrombin III	AT3	E
AP-2, alpha	TFAP2A	G
AP-2, beta	· · · · ·	G
AP-2, gamma		Ğ
Apaf-1		s
Apoptosis antigen 1	APT1	ī
Apoptosis antigen ligand 1	APT1LG1	i
Apoptosis-inducing factor	AIF	i
Apurinic endonuclease		Ė
Arginine vasopressin		N
Arginosuccinate synthetase		
		E
And hydrocarbon receptor		T
Aryl hydrocarbon receptor nuclear translocator		T
Asparagine synthetase		E
Aspartate receptor		N
Ataxia telangiectasia complementation group D		G
Ataxia telangiectasia gene, AT		G
ATP cobalamin adenoxyltransferase		Ε
ATP sulphurylase	atpsk2	Ε

ATP-binding cassette transporter 7 Atrial natriuretic peptide Atrial natriuretic peptide receptor A Atrial natriuretic peptide receptor B Atrial natriuretic peptide receptor C Atrophin 1 Bagpipe homeobox, drosophila homolog of, 1 B-cell CLL/lymphoma 1 B-cell CLL/lymphoma 3 B-cell CLL/lymphoma 3 B-cell CLL/lymphoma 5 B-cell CLL/lymphoma 6 B-cell CLL/lymphoma 7 B-cell CLL/lymphoma 8 B-cell CLL/lymphoma 9 BCL2-associated X protein BCL2-related protein A1 Beckwith-Wiedemann region 1A Benzodiazepine receptor beta 2 microglobulin beta-endorphin receptor beta-synuclein Bleomycin hydrolase Bone morphogenetic protein, BMP1 Bone morphogenetic protein, BMP2 Bone morphogenetic protein, BMP3 Bone morphogenetic protein, BMP4 Bone morphogenetic protein, BMP5 Bone morphogenetic protein, BMP6 Bone morphogenetic protein, BMP7 Bone morphogenetic protein, BMP7 Bone morphogenetic protein, BMP7 Bone morphogenetic protein, BMP8 Bradykinin receptor B1 Bradykinin receptor B2 Brain derived neurotrophic factor (BDNF) receptor	ABC7 ANP NPR1 NPR2 NPR3 DRPLA BAPX1 BCL1 BCL10 BCL3 BCL4 BCL5 BCL6 BCL7 BCL8 BCL9 BAX BCL2A1 BWR1A B2M SNCB BLMH BMP1 BMP2 BMP3 BMP4 BMP5 BMP6 BMP7 BMP8	-00000000000X-XXE0000000000
Branched chain aminotransferase 1, cytosolic Branched chain aminotransferase 2,	BCAT1 BCAT2	E . E
mitochondrial BRCA1-associated RING domain gene 1	BARD1	G
Breakpoint cluster region	BCR	G G
Breast cancer 1	BRCA1	G
Breast cancer 2	BRCA2	G
Breast cancer, ductal, 1		
Breast cancer, ductal, 1		G
·		G
Bruton agammaglobulinaemia tyrosine kinase	BTK	G
C1 inhibitor		E

Cadherin E	CDH1	G
Cadherin EP		Ğ
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calbindin 1	CALB1	Ğ
Calbindin D9K	CALB3	Ğ
Calcitonin receptor /Calcitonin gene-related	CALCR	N
peptide receptor		
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	N
Calcium channel, voltage-dependent, alpha 1F subunit	CACNA1F	Ν
Calcium channel, voltage-dependent, Alpha-	CACNIAAD	
1B (CACNL1A5)	CACNA1B	N
Calcium channel, voltage-dependent, Alpha- 1C	CACNA1C	Ν
Calcium channel, voltage-dependent, Alpha- 1D	CACNA1D	N
Calcium channel, voltage-dependent, Alpha- 1E (CACNL1A6)	CACNA1E	N
Calcium channel, voltage-dependent, Alpha- 2/delta	CACNA2	N
Calcium channel, voltage-dependent, Beta 1	CACNB1	K.
Calcium channel, voltage-dependent, Beta 3	CACNB1	N
Calcium channel, voltage-dependent, Leta 3	CACNA1S	N
alpha 1S subunit	CACNATS	N
Calcium channel, voltage-dependent,	CACNG2	N
Neuronal, Gamma		
Calcium channel, voltage-dependent, P/Q	CACNA1A	Ν
type, alpha 1A subunit		
Calcium channel, voltage-dependent, T-type		Ν
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CAMK2A	G
Calnexin	CANX	G
Carbonic anhydrase 3	CA3	E
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	E
Cardiac-specific homeobox, CSX	CSX	Ğ
Cartilage-hair hypoplasia gene	СНН	N
Caspase 1	CASP1	Ğ
Caspase 10	CASP10	Ğ
Caspase 2	CASP2	Ğ
Caspase 3	CASP3	Ğ
Caspase 4	CASP4	G
Caspase 5	CASP5	G

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Caspase 6	CASP6	G
Caspase 7	CASP7	Ğ
Caspase 8	CASP8	G
Caspase 9	CASP9	Ğ
Catenin, beta	CTNNB1	Ğ
CD1	CD1	ĭ
CD10	CD10	i
CD4	CD4	i
CEA		Ġ
Cell adhesion molecule, intercellular, ICAM	ICAM1	G
Cell adhesion molecule, leukocyte-endothelial,		G
LECAM (CD62)		
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	PECAM1	G
PECAM	LOAMI	G
Cell adhesion molecule, vascular, VCAM	VCAM1	_
c-erbB1	ERBB1	G
c-erbB2	ERBB2	G G
c-erbB3	ERBB3	G
c-erbB4	ERBB4	G
Ceruloplasmin precursor	CP CP	E
Chemokine receptor CXCR1	CXCR1	<u>-</u>
Chemokine receptor CXCR2	CXCR2	ŀ
Cholecystokinin	CCK	N.
Cholecystokinin B receptor	CCKBR	N
Ciliary neurotrophic factor (CNTF)	CNTF	N
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	G
c-kit receptor tyrosine kinase	CNIFK	G
Clathrin		G T
Clusterin	CLU	
Collagen IV alpha 4	COL4A4	G S
Collagen IV alpha 5	COL4A5	
Collagen IV alpha 6	COL4A6	S S
Colony-stimulating factor 1	CSF1	
Colony-stimulating factor 1 receptor	CSF1R	G
Colony-stimulating factor 2	CSF2	.G
Colony-stimulating factor 2 alpha receptor	CSF2RA	G
Colony-stimulating factor 2 beta receptor		G
Colony-stimulating factor 3	CSF2RB	G
	CSF3	G
Colony-stimulating factor 3 receptor	CSF3R	G
Complement component C1 inhibitor	C1NH	1
Complement component C1qa	C1QA	1
Complement component C1qb	C1QB	-
Complement component C1qg	C1QG	1
Complement component C1r	C1R	I

Complement component C1s Complement component C2 Complement component C3 Complement component C4A Complement component C4B Complement component C5 Complement component C6 Complement component C7 Complement component C8 Complement component C9 Complex III	C1S C2 C3 C4A C4B C5 C6 C7 C8B	
Core-binding factor, alpha 1	CBFA1	G
Core-binding factor, alpha 2	CBFA2	G
Core-binding factor, beta	CBFB	G
Corticotrophin-releasing hormone	CRH	T
Corticotrophin-releasing hormone receptor	CRHR1	Ť
c-src tyrosine kinase	CSK	Ġ
Cyclic AMP-dependent protein kinase	PKA	E
Cyclin A	CCNA	Ğ
Cyclin B	CCNB	Ğ
Cyclin C	CCNC	G
Cyclin D	CCND1	G
Cyclin E	CCNE	G
Cyclin F	CCNF	G
Cyclin-dependent kinase 1	CDK1	G
Cyclin-dependent kinase 10	CDK10	G
Cyclin-dependent kinase 2	CDK2	G
Cyclin-dependent kinase 3	CDK3	G
Cyclin-dependent kinase 4	CDK4	G
Cyclin-dependent kinase 5	CDK5	G
Cyclin-dependent kinase 6	CDK6	G
Cyclin-dependent kinase 7	CDK7	G
Cyclin-dependent kinase 8	CDK8	G
Cyclin-dependent kinase 9	CDK9	G
Cyclin-dependent kinase inhibitor 1A (P21, CIP1)	CDKN1A	G
Cyclin-dependent kinase inhibitor 1B (P27, KIP1)	CDKN1B	G
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN1C	G
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	G
Cyclin-dependent kinase inhibitor 3	CDKN3	G
Cyclooxygenase 1	COX1	Ε
Cyclooxygenase 2	COX2	Ε
CYP11A1	CYP11A1	Ε
CYP11B1	CYP11B1	Ε
CYP11B2	CYP11B2	E
CYP17	CYP17	Ε

CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 CYP27 CYP27B1 CYP2A1 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C9 CYP2C9 CYP2C9 CYP2C9 CYP2D6 CYP2E1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A5 CYP3A5 CYP3A5 CYP3A5 CYP3A5 CYP3A6 CYP3A6 CYP3A7 CYP4B1 CYP4B1 CYP4B1 CYP4B1 CYP4B2 CYP4B3 CYP5A1 CYP7A CYP8 Cystathionase Cystathione beta synthase Cystic fibrosis transmembrane conductance	CYP19 CYP1A1 CYP1A2 CYP1B1 CYP24 CYP27 PDDR CYP2A1 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C19 CYP2C8 CYP2C9 CYP2D6 CYP2D6 CYP2D6 CYP2E1 CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4B1 CYP4B1 CYP4F2 CYP4F3 CYP5A1 CYP7A CYP8 CTH CBS CFTR	
regulator, CFTR		<u></u>
Cytidine deaminase Cytidine-5-prime-triphosphate synthetase	CDA CTPS	E E
Cytochrome a	OIFO	E
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	CSBP1	_
binding protein 1	JUDI 1	1
Cytokine-suppressive antiinflammatory drug-	CSBP2	ı
binding protein 2	· -	•
Defender against cell death 1	DAD1	G

Deleted in colorectal carcinoma	DCC	G
Deleted in malignant brain tumours 1	DMBT1	G
Deoxycytidine kinase DCK		E
Deoxyuridine triphosphatase; dUTPase		Ē
Desert hedgehog, dhh		Ğ
	DHFR	E
Dihydrofolate reductase	טחרא	
Dihydrolipoyl dehydrogenase	DDVD	E
Dihyropyrimidine dehydrogenase	DPYD	E
DM-Kinase	DMPK	E
DNA damage binding protein, DDB1	DDB1	S
DNA damage binding protein, DDB2	DDB2	S
DNA directed polymerase, alpha	POLA	E
DNA glycosylases		E
DNA helicases	•	E
DNA Ligase 1	LIG1	Е
DNA methyltransferase	DNMT	Ε
DNA polymerase 1		Ē
DNA polymerase 2		E
DNA polymerase 3		Ē
DNA primase		E
·	DDIT3	S
DNA-damage-inducible transcript 3	DONO	E
DNA-dependant RNA polymerase	DDC	. E
DOPA decarboxylase	DDC DDD1	N
Dopamine receptors D1	DRD1	
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	N
Dopamine receptors D5	DRD5	N
Dynamin	DNM1	G
Dynorphin receptor		N
Dysferlin	DYS, DYSF	E
Dyskerin	DKC1	S
EB1		G
Endoglin	ENG	S
Endothelin 1	EDN1	N
Endothelin 2	EDN2	N
Endothelin 3	EDN3	. N
Endothelin converting enzyme	ECE1	. N.
Endothelin receptor type A	EDNRA	N
Endothelin receptor type B	EDNRB	N
Enclase	ENO1	·Ε
Ephrin receptor tyrosine kinase A	EPHA	Ğ
Ephrin receptor tyrosine kinase A	EPHB	G
Epidermal growth factor	EGF	G
•		
Epidermal growth factor receptor	EGFR	G
Estrogen receptor	ESR 、	G
Eukaryotic initiation translation factor	EIF4E	G
EWS RNA-binding protein	EWSR1	G

·		
Excision repair complementation group 1	ERCC1	Ε
protein		
Excision repair complementation group 2	ERCC2	E
protein		
Excision repair complementation group 2	ERCC3	Ε
protein		
Excision repair complementation group 4	ERCC4	Ε
protein		
Excision repair complementation group 6	ERCC6	Ε
protein		
Exostosin 1	EXT1	S
Exostosin 2	EXT2	S
FADH dehydrogenase		Ε
Fanconi anemia, complementation group C	FANCC ·	T
Fanconi anemia, complementation group D	FANCD	Т
Fc fragment of IgG, high affinity IA, receptor for		G
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	G
Fc fragment of IgG, low affinity IIIa, receptor for	FCGR3A	G
(CD16)		_
Ferrochelatase	FECH	Ε
Fibrillin 1	FBN1	G
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
	FOLR	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
· · · · · · · · · · · · · · · · · · ·	FSHB	G
Follicular lymphoma variant translocation 1	FVT1	1
	FKHR	G
	FKHL14	G
	FKHL7	G
	FUT2	T
	FUT3	Т
	GTBP, MSH6	G
	GABRA1	N.
	GABRA2	N
	GABRA3	N
	GABRA4	N
	GABRA5	N
	GABRA6	N
	GABRB1	N
~ ^ ~ 	GABRB2	Ν
- • - •	GABRB3	Ν
	GABRG1	Ν
GABA receptor, gamma 2	GABRG2	N

GABA receptor, gamma 3 Gadd45 (growth arrest & DNA-damage-inducit	GABRG3	N
Galactosyltransferase 1	GT1	E G
Galactosyltransferase, alpha 1,3	GGTA1	
Galactosyltransferase, beta 3	B3GALT	G
Gastrin	GAS	G
Gastrin releasing peptide	GRP	G
Glioma chloride ion channel, GCC	GRP	T
Glucagon receptor	GCGR	G
Glucagon synthase	GCGR	G
Glucocorticoid receptor	GRL	T
Glutamate receptor 1	GLUR1	G
Glutamate receptor 2	GLUR2	N
Glutamate receptor 3	GLUR3	N
Glutamate receptor 4	GLUR4	N
Glutamate receptor 5	GLUR4 GLUR5	N
Glutamate receptor 6	GLUR6	N
Glutamate receptor 7	GLUR7	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	N N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
Glutathione	GSH	T
Glutathione S-transferase mu 1, GSTM1	GSTM1	Ė
Glutathione S-transferase theta 1, GSTT1	GSTT1	E
Glutathione S-transferase, GSTZ1	GSTZ1	Ē
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	E
GAPDH		_
Glycerol kinase	GK	Ε
Glycinamide ribonucleotide (GAR)	GART	Ē
transformylase		_
Glycine receptor, alpha	GLRA2	Ν
Glycine receptor, beta		N
Glycine transporter	GLYT	N
Glypican 3	GPC3, SDYS	G
Gonadotropin releasing hormone	GNRH	G
Gonadotropin releasing hormone receptor	GNRHR	G
Growth factor receptor-bound protein 2	GRB2	G
Growth hormone 1	GH1	G
Growth hormone 2 (placental)	GH2	G
Growth hormone receptor	GHR	G
Growth hormone releasing hormone (GHRH)	GHRH	G
Growth hormone releasing hormone receptor	GHRHR	G
Growth/differentiation factor 5	GDF5	G
Growth-regulated protein precursor, GRO	GRO	1
GTPase-activating protein, GAP	RASA1	Ģ
Guanine nucleotide-binding protein, alpha	GNAI1	Ň

to be the table of a section of the		
inhibiting activity polypeptide 1, GNAI1 Guanine nucleotide-binding protein, alpha	GNAI2	
inhibiting activity polypeptide 2, GNAI2	GNAIZ	Ν
Guanine nucleotide-binding protein, alpha	GNAI3	N
inhibiting activity polypeptide 3, GNAI3	317/113	14
Guanine nucleotide-binding protein, alpha	GNAS1	N
stimulating activity polypeptide, GNAS1		
Guanine nucleotide-binding protein, alpha	GNAS2	Ν
stimulating activity polypeptide, GNAS2		
Guanine nucleotide-binding protein, alpha	GNAS3	Ν
stimulating activity polypeptide, GNAS3	011404	
Guanine nucleotide-binding protein, alpha	GNAS4	Ν
stimulating activity polypeptide, GNAS4	CNAC	N.
Guanine nucleotide-binding protein, q polypeptide	GNAQ	N
Guanylate kinase		Ε
H(+), K(+) - ATPase	ATP4B	N
Hairless	HR	G
Hela tumor suppression gene	HTS1	Ğ
Heparin binding epidermal growth factor	HBEGF	Ğ
Hepatitis B virus integration site 1	HVBS1	Ī
Hepatitis B virus integration site 2	HVBS6	1
High mobility group protein C	HMGIC	G
High mobility group protein Y	HMGIY	G
Histamine receptors, H1		Ν
Histamine receptors, H2		Ν
Histamine receptors, H3	•	Ν
HLH transcription factor HAND1	HAND1	G
HLH transcription factor HAND2	HAND2	G
HMG-CoA reductase	HMGCR	E
HMG-CoA synthase	HMGCS2	E
Homeobox (HOX) gene A13	HOXA13	G
Homeobox 11	HOX11	G
Homeobox HB24	HLX1	G
Homogentisate 1,2 dioxygenase	HGD	E
Hormone-sensitive lipase	HSL	E
HSSB, replication protein	2211	Ē
Human placental lactogen	CSH1	.G
Ibonucleoside diphosphate reductase	UKABOO	E
Ikaros gene	IKAROS	G
Inhibin, alpha	INHA	G
Inhibin, beta A	INHBA	G
Inhibin, beta B Inhibin, beta C	INHBB	G
	INHBC	G
Inositol 1,4,5-triphosphate receptor 3 Insulin	ITPR3	G
Insulin receptor	INS INSR	G
Insulin-like growth factor 1		G
mount-like growth lactor 1	IGF1	G

Interleukin(IL) 8 receptor Interleukin(IL) 9 Interleukin(IL) 9 receptor Interleukin(IL) receptor antagonist 1 Janus kinase 1 Janus kinase 2 Janus kinase 3 Laminin 5, alpha 3 Laminin 5, beta 3 Laminin 5, gamma 2 Laminin M Laminin receptor 1 Latent transforming growth factor-beta binding protein 2	IL8R IL9 IL9R IL1RN, IL1RA JAK1 JAK2 JAK3 LAMA3 LAMB3 LAMB3 LAMC2 LAMM LAMR1 LTBP2	
Leptin	LEP	_
Leptin receptor	LEPR	G G
Leukaemia inhibitory factor	LIF	G
Leukaemia inhibitory factor receptor	LIFR	G
Leukotriene A4 hydrolase		Ī
Leukotriene B4 receptor	•	1
Leukotriene C4 receptor		1
Leukotriene D4/E4 receptor		i
LH/choriogonadotropin (CG) receptor	LHCGR	G
LIM homeobox protein 1	LHX1	G
LIM homeobox protein 2	LHX2	G
LIM homeobox protein 3	LHX3	G
LIM homeobox protein 4	LHX4	G
Limbic associated membrane protein	LAMP	G
LIM-domain only protein 1	LMO1	G
LIM-domain only protein 2	LMO2	G
LIM-domain only protein 3	LMO3	G
LIM-domain only protein 4	LMO4	G
Lipoma-preferred partner gene	LPP	G
Lipoxygenase 12 (platelets)	LOG12	ł
Lipoxygenase 5 (leukocytes)		1
Long QT-type 2 potassium channels	LQT2, KCNH2	T
Lowe oculocerbrorenal syndrome gene	OCRL	Ε
Luteinizing hormone-releasing hormone	e e e e	Ŋ
Luteinizing hormone-releasing hormone		N
receptor		
Lymphoblastic leukemia derived sequence 1	LYL1	1
Lymphocyte-specific protein tyrosine kinase	LCK	ı
Lymphoid enhancer-binding factor	LEF-1	G
Macrophage activating factor	MAF	ı
MAD (mothers against decapentaplegic, Drosophila) homologue 3	MADH3	G
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	G

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MADS box transcription-enhancer factor 2A	MEF2A	_
MADS box transcription-enhancer factor 2B	MEF2B	G G
MADS box transcription-enhancer factor 2C	MEF2C	
MADS box transcription-enhancer factor 2D	MEF2O MEF2D	G
Malignant proliferation, eosinophil gene		G
MAPK kinase 1	MPE	1
MAPK kinase 4	MAPKK1; MEK1	G
WAPK Kinase 4	MAPKK4; MEK4;	G
MADIZ Lines - C	SERK1	
MAPK kinase 6	MAPKK6; MEK6	G
MAPKK kinase	MAPKKK	G
MAX-interacting protein 1	MXI1	G
MEK kinase, MEKK		Ε
Melanocortin 1 receptor	MC1R	Т
Menin	MEN1	G
Methionine adenosyltransferase	MAT1A, MAT2A	Ε
Methionine synthase	MTR	Е
Methionine synthase reductase	MTRR	Е
Methylguanine-DNA methyltransferase	MGMT	Ε
MHC Class I: A	,	
MHC Class I: B		1
MHC Class I: C		· i
MHC Class I: LMP-2, LMP-7		i
MHC Class I: Tap1	ABCR, TAP1	i
MHC Class II: DP	HLA-DPB1	i
MHC Class II: DQ		i
MHC Class II: DR		i
MHC Class II: Tap2	TAP2, PSF2	i
MHC Class II:Complementation group A	MHC2TA	i
MHC Class II:Complementation group B	rfxank	i
MHC Class II:Complementation group C	RFX5	1
MHC Class II:Complementation group D	RFXAP	
Midline 1	MID1	Ġ
Mismatch repair gene, PMSL1	PMS1	G
Mismatch repair gene, PMSL2	PMS2	G
Mitogen-activated protein (MAP) kinase	MAPK	G
Motilin	MLN	G
Msh homeobox homolog 1		G
Msh homeobox homolog 2	MSX1	G
Mucin 18	MSX2	G
Muscarinic receptor, M1	MUC18	T
	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Mutated in colorectal cancers, MCC	MCC	G
MutL homolog 1	MLH1	G
MutS homolog 2	MSH2	G
MutS homolog 3	MSH3	G

Myelin protein peripheral 22 Myelodysplasia syndrome 1 gene Myeloid leukemia factor-1 N-acetyltransferase 1 N-acetyltransferase 2 NADPH-dependent cytochrome P450 reductase	PMP22 MDS1 MLF1 NAT1 NAT2 POR	SGIEEE
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neuregulin	HGL	G
Neurexin		Ν
Neurofibromin 1		G
Neurofibromin 2		G
Neurokinin A	NKNA	Ν
Neurokinin B	NKNB	N
Neuronal apoptosis inhibitory protein	NAIP	I
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2 Neurotensin	NPY2R NTS	N
Neurotensin receptor	NTSR1	N N
Neurotrophic tyrosine kinase receptor 1		G
Neutral endopeptidase		E
Niacin receptor		G
Nodal		Ğ
Norrie disease protein		Ğ
Notch 3		G
Notch ligand - jagged 1		G
Nuclear factor kappa beta	NFKB ·	1
Nuclear factor of activated T cells (NFAT)	NFATC	G
complex, cytosolic		
Nuclear factor of activated T cells (NFAT)	NFATP	G
complex, preexisting component		
Nuclear mitotic apparatus protein 1		G
Nucleophosmin	NPM1	T
Oligophrenin-1		G
Oncogene abl1		G
Oncogene abl2		G.
Oncogene akt1		G
Oncogene akt2 Oncogene axl		G G
Oncogene bcl2		G
Oncogene bcr/abl		G
Oncogene B-lym		G
Oncogene B-raf		G
Oncogene clk1		Ğ
Oncogene c-myc		Ğ
Oncogene cot		Ğ

Oncogene crk		G
Oncogene crkl		Ğ
Oncogene ect2		Ğ
Oncogene ELK1	ELK1	Ğ
Oncogene ELK2	ELK2	Ğ
Oncogene ems1	·	G
Oncogene ERB		G
Oncogene ERB2	•	Ğ
Oncogene ERBA		· G
Oncogene ERBAL2		G
Oncogene ERG (early reponse gene)		G
Oncogene ETS1		G
Oncogene ETS2		G
Oncogene EVI1	EVI1	G
Oncogene fes	2411	. G
Oncogene fgr		G
Oncogene fos	FOS	G
Oncogene fps	, 00	G
Oncogene GLI1	GLI	G
Oncogene GL12	GLI2	G
Oncogene GLI3	GLI3	G
Oncogene gro1	02.0	Ğ
Oncogene gro2		Ğ
Oncogene Ha-ras	HRAS	Ğ
Oncogene hs1		G
Oncogene hst	FGF4	Ğ
Oncogene int1	WNT1	Ğ
Oncogene int2	FGF3	Ğ
Oncogene int3	Notch4	Ğ
Oncogene int4	WNT3	Ğ
Oncogene jun	JUN	Ğ
Oncogene KIT	KIT, PBT	Ğ
Oncogene LCO	LCÓ	Ğ
Oncogene I-myc	•	Ğ
Oncogene Ipsa		Ğ
Oncogene lyn		G
Oncogene maf		G
Oncogene mas1		G
Oncogene mcf2		G
Oncogene mdm2	MDM2	G
Oncogene mel		G
Oncogene met	MET	G
Oncogene mos		Ğ
Oncogene mpl		G
Oncogene MUM1	MUM1	G
Oncogene myb	MYB	Ğ
Oncogene myc	MYC ·	G
Oncogene n-myc		G
		_

•		
Oncogene N-ras (neuroblastoma v-ras)	NRAS	G
Oncogene ovc	·	Ğ
Oncogene pim1		Ğ
Oncogene pti-1sea		G
Oncogene pvt1		G
Oncogene raf	RAF	G
Onçogene ralb	· - ·	G
Oncogene rel		G
Oncogene ret	RET	G
Oncogene r-myc		G
Oncogene ros		G
Oncogene R-ras		G
Oncogene sis	PDGFB	G
Oncogene ski	1 501 5	G
Oncogene sno		G
Oncogene spi1		G
Oncogene src		G
Oncogene tc21		G
Oncogene TEL	ETV6	G
Oncogene tim	LIVO	G
Oncogene vavtrk		
Oncogene v-Ki-ras2	KRAS2	G
Oncogene yes	RNA32	G
Oncogene yuasa		G
Oncostatin M	OSM	G
Oncostatin M receptor	OSMR	G
Opioid receptor, delta		G
Opioid receptor, kappa	OPRD1 OPRK1	N
Opioid receptor, mu		N
Orexin	OPRM1	N
Osteopontin	OZ	G
Oxytocin	OPN	G
Oxytocin receptor	OXT	N
Paired box homeotic gene 3	OXTR	N
	PAX3	G
Paired box homeotic gene 6 Paired box homeotic gene 7	PAX6	G
	PAX7	G
Paired-like homeodomain transcription factor 2		G
Paired-like homeodomain transcription factor 3		G
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	G
Parvalbumin	PVALB	G
Patched (Drosophila) homolog, PTCH	PTCH	G
PCNA (proliferating cell nuclear antigen)		Ε
Peanut-like 1	PNUTL1	1
Peroxisome proliferative activated receptor,	PPARA	T.
alpha		
Peroxisome proliferative activated receptor,	PPARG	T
,		•

gamma	•	
P-glycoprotein 1	PGY1	Т
P-glycoprotein 3	PGY3	Т
Phenylalanine hydroxylase	PAH	Ε
Phosphatase & tensin homolog	PTEN	G
Phosphatidylinositol glycan, class A	PIGA	G
(paroxysmal nocturnal hemoglobinuria)		_
Phospholipase A2, group 10	PLA2G10	ī
Phospholipase A2, group 1B	PLA2G1B	i
Phospholipase A2, group 2A	PLA2G2A	i
Phospholipase A2, group 2B	PLA2G2B	i
Phospholipase A2, group 4A	PLA2G4A	i
Phospholipase A2, group 4C	PLA2G4C	i
Phospholipase A2, group 5	PLA2G5	i
Phospholipase A2, group 6	PLA2G6	i
Phospholipase C epsilon		i
Phosphomannomutase 1	PMM1	Ġ
Phosphomannomutase 2	PMM2	Ğ
Plasminogen	PLG	Ē
Plasminogen activator inhibitor 1	PAI1	Ē
Plasminogen activator inhibitor 2	PAI2	E
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	E
Plasminogen activator, Urokinase	UPA; PLAU	E
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Platelet glycoprotein 1b, beta	GP1BB	1
Platelet glycoprotein 1b, gamma	GP1BG	1
Platelet glycoprotein IX	GP9	1
Platelet glycoprotein V	GP5	1
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1	N
Potassium voltage-gated channel E1	KCNE1	Ν
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	Ν
Potassium voltage-gated channel Q3	KCNQ3	N
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)		
POU domain, class 3, transcription factor 4	POU3F4	G
POU domain, class 4, transcription factor 3	POU4F3	G
Pre-B-cell leukemia transcription factor 1	PBX1	G
Preproglucagon	GCG;GLP1; GLP2	G
Preproglucagon		Т
Prion protein	PRNP	N
Prodynorphin		N
Progesterone receptor (RU486 binding	PGR	G
receptor)		
· F /		

•	•	
Prohibitin	PHB	G
Prolactin	PRL	G
Prolactin receptor	PRLR	G
Prolactin releasing hormone	PRH	G
Proliferin	PL F	G
Promyelocytic leukemia gene	PML	Ğ
Proopiomelanocortin	POMC	Ň
Prophet of Pit1	PROP1	G
Prostacyclin synthase		ĭ
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	i
Prostaglandin D - DP receptor		i
Prostaglandin E1 receptor	•	i
Prostaglandin E2 receptor		i
Prostaglandin E3 receptor		i
Prostaglandin F - FP receptor		i
Prostaglandin IP receptor		
Prostate cancer anti-metastasis gene KAI1	KAI1	Ġ
Protein kinase B	PRKB	G
Protein kinase C, alpha	PRKCA	· E
Protein phosphatase 2, regulatory subunit A,	PPP2R1B	E
beta isoform	PPPZKIB	
Protein tyrosine phosphatase, non-receptor	PTPN12	G
·	FIFNIZ	G
type 12	NP	Е
Purine nucleoside phosphorylase	NE	N
Purinergic receptor P1A1		N
Purinergic receptor P1A2		
Purinergic receptor P1A3	DODY4	N
Purinergic receptor P2X, 1	P2RX1	N
Purinergic receptor P2X, 2	P2RX2	N
Purinergic receptor P2X, 3	P2RX3	N
Purinergic receptor P2X, 4	P2RX4	N
Purinergic receptor P2X, 5	P2RX5	N
Purinergic receptor P2X, 6	P2RX6	N
Purinergic receptor P2X, 7	P2RX7	N
Purinergic receptor P2Y, 1	P2RY1	N
Purinergic receptor P2Y, 11	P2RY11	N
Purinergic receptor P2Y, 2	P2RY2	N
Rabphilin		- N
RAD51, DNA repair protein	RAD51	Ģ
RAD52, DNA repair protein	RAD52	G
RAD54, DNA repair protein	RAD54	G
RAD55, DNA repair protein	RAD55	G
RAD57, DNA repair protein	RAD57	G
RAS-associated protein, RAB3A	RAB3A	Ν
Ras-G-protein	RAS	G
Receptor tyrosine kinase (RTK), Nsk2	NSK2	G
Relaxin H1	RLN1	G
Relaxin H2	RLN2	G

·		
Replication factor A		Ε
Replication factor C	RFC2	Ε
Retinoblastoma 1	RB1	G
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoschisis, X-linked, juvenile		G
Rhabdoid tumors		Ġ
Ribonucleotide reductase, RRM		E
Ribosomal protein L13A		G
Ribosomal protein L17		Ğ
Ribosomal protein S6 kinase		Ē
RIGUI		G
Rim		N
Ryanodine receptor 1, skeletal		G
S-adenosylmethionine decarboxylase, AMD		E
SAP (SLAM-associated protein)		<u> </u>
Secretin		T
Secretin receptor, SCTR		T
Serine hydroxymethyltransferase		Ė
Serine/threonine kinase 11		G
Serine/threonine kinase 2		G
Serotonin receptor, 5HT1A		N
		N
Serotonin receptor, 5HT1B		N
Serotonin receptor, 5HT1D		N
Serotonin receptor, 5HT1D		N
Serotonin receptor, 5HT1E		N
Serotonin receptor, 5HT1F		N
Serotonin receptor, 5HT2A		N
Serotonin receptor, 5HT2B		N
Serotonin receptor, 5HT2C		N
Serotonin receptor, 5HT3		
Serotonin receptor, 5HT4		N
Serotonin receptor, 5HT5		N
Serotonin receptor, 5HT6		N
Serotonin receptor, 5HT7		N
Signal transducer and activator of transcription	SIAIT	G
	07470	_
Signal transducer and activator of transcription	STATZ	G
2	07170	_
Signal transducer and activator of transcription	SIAI3	G
3		_
Signal transducer and activator of transcription	STAT4	G
4	·	_
Signal transducer and activator of transcription	STAT5	G
5		
Signaling lymphocyte activation molecule	SLAM	1
Sine oculis homeobox, drosophila, homolog 1	SIX1	G

Sine oculis homeobox, drosophila, homolog 2	SIX2	G
Sine oculis homeobox, drosophila, homolog 5	SIX5	Ğ
Small nuclear ribonucleoprotein polypeptide N	SNRPN	S
Smoothened (Drosophila) homolog	SMOH	G
Sodium channel, non-voltage gated 1, alpha	SCNN1A	
,		N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma	SCNN1G	Ν
Sodium channel, voltage gated, type V, alpha	SCN5A	Ν
polypeptide		
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		
Solute carrier family 1 (glutamate transporter),	SLC1A1	T
member 1		
Solute carrier family 1 (glutamate transporter),	SLC1A2	Т
member 2		•
Solute carrier family 12, member 1	SLC12A1	Т
Solute carrier family 12, member 2	SLC12A2	Ť
Solute carrier family 12, member 3	SLC12A3	Ť
Solute carrier family 19 (folate transporter),	SLC19A1	
member 1	SECTOAT	T
Solute carrier family 25, member 12	C1 C25A42	_
	SLC25A12	Ţ
Solute carrier family 5 (sodium/glucose	SLC5A1	T
transporter), member 1		
Solute carrier family 5 (sodium/glucose	SLC5A2	T
transporter), member 2		
Solute carrier family 5 (sodium/glucose	SLC5A5	T
transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	T ·
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member 1		
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3	J. 1	
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2	·	•
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		•
Somatostatin	SST	N
Somatostatin receptor, SSTR1	SSTR1	
Somatostatin receptor, SSTR2		N
·	SSTR2	G
Somatostatin receptor, SSTR3	SSTR3	N
Somatostatin receptor, SSTR4	SSTR4	Ν
Somatostatin receptor, SSTR5	SSTR5	Ν
Sorcin	SRI	T
SOS1 guanine nucleotide exchange factor	SOS1	G
SRY-box 11	SOX11	G
Stem cell factor	SCF	G
Steroid hormone receptor responsive DNA		G
elements		

Steroidogenic acute regulatory protein	STAR	T
Substance P		Ν
Sulfonylurea receptor	SUR	G
Suppression of tumorigenicity 3 gene	ST3	G
Suppression of tumorigenicity 8 gene	ST8	G
Surfeit 1	SURF1	G
Synapsin 1a & 1b	SYN1	Ň
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle protein 2	SV2	N
Synaptobrevin 1	SYB1	N
Synaptobrevin 2	SYB2	N
Synaptogyrin		N
Synaptophysin	SYP	N
Synaptosomal-associated protein, 25KD	SNAP25	N
Synaptotagmin 1	SYT1	N
Synaptotagmin 2	SYT2	N
Syndecan 1	SYND1	
		G
Syndecan 2	SYND2	G
Syndecan 3 Syndecan 4	SYND3	G
	SYND4	G
Synovial sarcoma gene 1	SSX1	G
Synovial sarcoma gene 2	SSX2	G
Syntaxin 1	STX1	N
Tachykinin receptor, NK1R	TACR1	N
Tachykinin receptor, NK2R	TACR2	N
Tachykinin receptor, NK3R	TACR3	N
Talin	TLN	G
Talin, TLN		S
T-cell acute lymphocytic leukemia 1	TAL1	ı
T-cell acute lymphocytic leukemia 2	TAL2	. !
T-cell receptor, alpha	TCRA	1
T-cell receptor, delta	TCRD	i
Telomerase protein component	·	Ε
Tenascin (cytotactin)	•	S
Tenascin XA	TNXA	S
Terminal deoxynucleotidyltransferase, TDT		Ε
Testis-specific protein Y	TSPY	G
Thrombopoietin	THPO	G
Thromboxane A synthase 1	TBXAS1	-
Thromboxane A2	TXA2	1
Thromboxane A2 receptor	TBXA2R	
Thy-1 T-cell antigen	THY1	1
Thymidylate synthase	TYMS	Ε
Thymopoietin	TMPO	G
Thymosin		- 1
Thyroid-stimulating hormone receptor	TSHR	G
Thyroid-stimulating hormone, alpha	TSHA	G
Thyroid-stimulating hormone, beta	TSHB	G

Thursday in the saint house of	TOU	
Thyrotropin releasing hormone	TRH	N
Thyrotropin releasing hormone	TRH	G
Thyrotropin releasing hormone receptor	TRHR	Ņ
Tip-associated protein	TAP	1
Tissue inhibitor of metalloproteinase 1, TIMP1	TIMP1	E
Tissue inhibitor of metalloproteinase 2, TIMP2	TIMP2	Ε
Tissue inhibitor of metalloproteinase 3, TIMP3	TIMP3	E
Tissue inhibitor of metalloproteinase 4, TIMP4	TIMP4	Ε
Topoisomerase II		Ε
Transacylase		EET
Transcobalamin 1, TCN1	•	
Transcobalamin 2, TCN2	TCN2	T
Transcription factor 1, hepatic	TCF1	G
Transcription factor 2, hepatic	TCF2	G
Transcription factor 3	TCF3	G
Transcription factor binding to IGHM enhancer	TFE3	G
3		
Transcription termination factor, RNA	TTF1	G
polymerase 1		
Transcription termination factor, RNA	TTF2	G
polymerase 2		
Transcription termination factor, RNA	TTF3	G
polymerase 3		
Transferrin	TF	G
Transferrin receptor .	TFRC	G
Transforming growth factor, alpha	TGFA	G
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Translocation in renal carcinoma on	TRC8	G
chromosome 8 gene		
Tuberous sclerosis 1	TSC1	G
Tuberous sclerosis 2	TSC2	G
Tubulin		S
Tumor susceptibility gene 101	TSG101	G
Tumour necrosis factor (TNF) receptor	TRAF1	i
associated factor 1		
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3		
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4		•
Tumour necrosis factor (TNF) receptor	TRAF5	1
associated factor 5	· · ·	•
Tumour necrosis factor (TNF) receptor	TRAF6	1
associated factor 6	-	•
Tumour necrosis factor alpha	TNFA	1
'		•

Tumour necrosis factor alpha receptor	TNFAR	i
Tumour necrosis factor beta	TNFB	1
Tumour necrosis factor beta receptor	TNFBR	1
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tumour protein p73	TP73	Ğ
Tumour protein, translationally-controlled 1	TPT1	G
Tumour suppresssor gene DRA	DRA	
· · · · · · · · · · · · · · · · · · ·	TWIST	. 1
Twist (Drosophila) homolog	IVVIOI	G
Ubiquitin		G
Ubiquitin activating enzyme, E1		E
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
Ubiquitin fusion degeneration 1-like	UFD1L	G
Ubiquitin protein ligase E3A	UBE3A	E
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	N
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	N
Vitamin B12-binding (R) protein	• • • • • • • • • • • • • • • • • • • •	G
Vitamin D receptor	VDR	G
v-myc avian myelocytomatosis viral oncogen		Ğ
homolog	5 III. 5	· ·
Von Hippel-Lindau gene	VHL	G
Werner syndrome helicase	WRN	G
Wilms tumour gene 1	WT1	G
	WT2	G
Wilms tumour gene 2		
Wilms tumour gene 4	WT4	G
Winged helix nude	WHN	G
Wiskott-Aldrich syndrome protein	WASP, THC	1
Xeroderma pigmentosum, complementation	XPB	E
group B		
Xeroderma pigmentosum, complementation	XPC	Ε
group C		
Xeroderma pigmentosum, complementation		Ε
group D		
Xeroderma pigmentosum, complementation		E
group E		
Xeroderma pigmentosum, complementation	XPF	Ε
group F		
Xeroderma pigmentosum, complementation	ERCC5	E
group G		_
X-ray repair gene	XRCC9	G
YY1 transcription factor	YY1	G
Zinc finger protein 198	ZIC198	S
Zinc linger protein 198 Zinc finger protein HRX	ALL1	3
Zino iniger protein mmx	ALLI	

In a third aspect.

CENTRAL NERVOUS SYSTEM (NEUROLOGICAL, NEUROPSYCHIATRIC, PSYCHIATRIC, PSYCHOLOGICAL AND SOCIAL) DYSFUNCTION, DISEASE AND DAMAGE

The invention relates to a method of assessing the risk of developing the clinical or social consequences of central nervous system dysfunction, damage or disease and indicating appropriate therapeutic interventions.

The 1990's has been heralded as the 'decade of the brain' and the cumulative efforts of research groups around the world have led to considerable advances in our understanding of the principles, physiology and mechanisms of brain or more properly central nervous system (CNS) function.

The primary role of CNS function is to gather, integrate, and evaluate information concerning the organisms internal and external environments and then formulate actions designed to achieve the organisms' goals. In man such a simplistic summary lies behind our understanding of the physiology of the simple reflex ark and our crude attempts at investigating the information processing/physiology interface which enables the higher cognitive functions (e.g. reading, writing, mathematics, music etc.).

The CNS often referred to as a single organ in the body. In reality it is a closely interconnected series of specialised sub-organs (e.g. hypothalamus, cortex, cerebellum, thalamus etc) which are known to have discrete functions. Understanding brain function implies a clear understanding of the biochemical, physiological and informational parameters which enable the interconnections between these sub-organs and which control the nature, direction and volume of information flow between them.

The CNS is made up of two major types of cells – neurones and glia. Neurones have a variety of morphological types (Betz cell, pyramidal cell etc) but each type has a common set of morphological features – cell body, dendrites, axon and axon terminals. Axons can be very long (up to 1 metre for spinal tracts) and project to distant regions of the CNS. Bundles of axons form the white matter tracts within the CNS. In terms of the processes of communication dendrites and axons are critical features as incoming information is usually received on dendrites whereas axons are the channels for information outflow. Communication between neurones is achieved by means of the release of neurotransmitters (a label which includes many types of molecules e.g. peptides, amines and nitric oxide) from specialised sites on axons – synapses. Thus, the release of neurotransmitters and their movement across the synaptic gap and interaction with receptor sites on neighbouring neurones is the core functional mechanism in the CNS.

Glial cells outnumber neurones and are divided into astrocytes, oligodendrocytes and microglia. Glia had been considered as having a 'support' role for neuronal functioning. It is now realised that their functions extend far beyond this and that they may be actively involved in the information processing function and in the

modulation of the neuronal environment. Microglia have a critical role in the response of the CNS to disease, infection and damage. Such events 'activate' microglia causing them to release a variety of factors (e.g. cytokines, growth factors) which aid the recovery and regeneration of CNS functions.

The point to point contact between specific sets of neurones is critical for CNS function. Failure of this point to point contact either through dysfunction, damage or disease lies at the heart of the appearance of neurological, psychiatric, psychological or social difficulties following such events (Roberts, Leigh and Weinberger 1993, Youdofsky and Hales 1994, Gelder 1996, Weatherall, Leadingham and Warrell 1996) Lishman 1997).

The information processing capacity of the CNS can be compromised in a number of ways. These can be categorised as: dysfunction, damage or disease.

CNS DYSFUNCTION

A number of disorders present as subtle or marked changes from socially accepted norms in the way that ideas, thoughts or mood states are experienced or acted upon. In many cases although the presence of such phenomena can be readily documented at clinical interview, the identification of a CNS lesion or biochemical abnormality is not possible. Examples of this type of CNS dysfunction include, depression, anxiety, obssessive behaviour, delusions, hallucinations, trances and fugue-like states (Gelder et al 1996, Lishman 1997). Such types of disorders include;

Schizophrenia
Depression
Anxiety states
Mania
Delirium

Paranoia

Personality disorders Sleep disorders Psychopathic disorders

Sociopathic disorders

In many of these disorders drug therapy design to modify the actions of particular neurotransmitters can be very effective (e.g. neuroleptics, lithium, benzodiazepines).

CNS DAMAGE

The CNS is a metabolically active soft jelly like tissue, floating within a rigid box — the skull. As a result of its physical structure it is vulnerable to damage caused by events which physically separate nerve connections, alter patterns of nerve growth, cause fluctuations in the delivery of nutrients and oxygen (either directly or as a result of compromised function in other organs) or clearance of toxins or wastes or result in a space occupying lesion. Common causes of CNS damage include;

Head and spinal trauma

Birth complications

Stroke

Cardiovascular disease

Epilepsy
Tumours
Blood-brain barrier compromise
Drug abuse
Oxygen deprivation
Fever
Malnutrition
Developmental disorders

CNS DISEASE

A large number of diseases are known which result in compromise or degeneration of CNS tissues (Roberts, Leigh and Weinberger 1993, Ellison et al 1997, Lishman 1997). These diseases range from infection with viruses or bacteria, to degenerative disorders affecting specific regions, to auto-immune disorders. In many cases the incidence of disease will rise steeply with age (particularly true of the dementias). In a number of diseases genetic factors are known to be of particular importance (e.g. presenilin in Alzheimer's disease, prion protein in prion disease). Common diseases affecting the CNS include;

Alzheimer's disease
Parkinsons disease
Cerebrovascular disease
Meningitis
AIDS dementia complex
Endocrine disorders
Muscular dystrophy
Multiple sclerosis

CNS dysfunction, damage and disease can give rise to a wide variety of symptoms, many of which will have profound clinical and social consequences. Symptoms and signs can range from mild forgetfulness to full blown dementia and slight tremors to status epilepticus. Because of the functional parcellation of the CNS the exact constellation of symptoms in any given case of CNS dysfunction, damage or disease will depend upon the site and extent of the CNS which has had its function compromised (Lishman 1997). The scientific understanding of CNS function has been harnessed to this clinical need and as a result drugs used to modify CNS function are now one of the most widely used category of drugs in medicine. Anaesthetics for pain relief, anti-psychotics for the symptoms of schizophrenia and anti-epileptics for seizure control are some examples of the diverse types of drugs currently available. In many cases good or adequate relief of symptoms can be achieved by appropriate treatments. However, many drugs used to treat CNS dysfunction, damage and disease have significant side effects and need to be used in a carefully controlled way (e.g. anti-psychotics are associated with the appearance of extrapyramidal symptoms, tardive dyskinesias and neuroleptic malignant syndrome Gelder et al 1996, Brody, Larner and Minneman 1998,).

Although some success has been achieved with drugs designed to modulate the activity of neurotransmitters and their receptors (e.g. selective serotonin reuptake inhibitors for depression, cholinomimetics for cognition). Less progress has been

made in therapeutic interventions aimed at restoring or regenerating lost or damaged nerve connections (e.g. such as those following spinal trauma) or aimed at replacing or augmenting neurones damaged or destroyed as a result of degenerative diseases (e.g neuronal loss in Parkinson's disease or prion disease). Preliminary studies with such approaches as neuronal transplantation or implants or infusion of growth factors have demonstrated limited success.

The physiology and control of the body's central nervous system is extremely complex and involves the synergistic or inhibitory interaction between multiple regulatory pathways and molecular cascades. Variation in the functionality of the proteins involved in these processes will, inevitably, cause or have an impact on the functioning of these systems or an individuals attempts to minimise damage and restore function following dysfunction, damage or disease in these systems. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from CNS dysfunction, damage or disease including genetic history, age, sex, nutritional status, pre-existing disease or injury, drug treatments and socioeconomic circumstances. Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to damage, dysfunction or disease affecting the CNS and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at the heart of the difficulties experienced in the healthcare and social management of CNS damage, dysfunction or disease.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

CNS GENE LIST	HUGO gene	Protein
	symbol	function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	Ε
2,3-bisphosphoglycerate mutase	BPGM	E
2,4-dienoyl CoA reductase	DECR	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	E
3-oxoacid CoA transferase	OXCT	E

A fee day 1		
4-hydroxyphenylpyruvate dioxygenase	HPD	E
5,10-methylenetetrahydrofolate reductase	MTHFR	Ε
(NADPH)	D**0	
6-pyruvoyltetrahydropterin synthase	PTS	E
Acetoacetyl 2-CoA-thiolase	ACAT2	E E
Acetyl CoA acyltransferase	ACAA	E
Acetyl CoA carboxylase alpha	ACACA	E
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Acyl CoA dehydrogenase, long chain	ACADL	E
Acyl CoA dehydrogenase, medium chain	ACADM	E
Acyl CoA dehydrogenase, short chain Acyl-CoA thioesterase	ACADS	E
Adaptin, beta 3A	ADTDAA	E
Adducin, alpha	ADTB3A	T
Adducin, aipha Adducin, beta	ADD1 ADD2	S
Adenosine monophosphate deaminase	AMPD	S E
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	N N
Adenyl cyclase	ABOING	N N
Adenylate cyclase 1	ADCY1	E
Adenylate cyclase 2	ADCY2	Ē
Adenylate cyclase 3	ADCY3	Ē
Adenylate cyclase 4	ADCY4	· E
Adenylate cyclase 5	ADCY5	Ē
Adenylate cyclase 6	ADCY6	. Ē
Adenylate cyclase 7	ADCY7	Ē
Adenylate cyclase 8	ADCY8	Ē
Adenylate cyclase 9	ADCY9	Ē
Adenylosuccinate lyase	ADSL	Ē
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N.
Adrenergic receptor, beta2	ADRB2	N

Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH) receptor	ADRB3 ACTHR	N G
Adrenoleukodystrophy gene	ALD	E
Albumin, ALB	ALB	T
Aldehyde dehydrogenase 10	ALDH10	Ė
Aldolase A	ALDOA	E
Aldolase B	ALDOB	Ē
Aldolase C	ALDOC	Ē
Aldosterone receptor	MLR	Ğ
Alpha 2 macroglobulin	A2M	Ĭ
alpha tectorin	TECTA	Ġ
alpha thalassemia gene	ATRX	N
alpha1-antitrypsin	PI	Ε
alpha2-antiplasmin	PLI	Ē
alpha-Galactosidase A	GLA	E
alpha-ketoglutarate dehydrogenase		E
alpha-L-Iduronidase	IDUA	Ε
alpha-synuclein	SNCA	N
Aminomethyltransferase	AMT	Ε
Aminopeptidase P	XPNPEP2	Ε
Amylo-1,6-glucosidase	AGL	Ε
Amyloid beta (A4) precursor protein-binding,	APBB1	Ν
APBB1		
Amyloid beta A4 precursor protein	APP	Ν
Amyloid beta A4 precursor-like protein	APLP	N
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	E
Angiotensin receptor 1	AGTR1	T
Angiotensin receptor 2	AGTR2	T
Angiotensinogen	AGT	E
Antidiuretic hormone receptor	ADHR	T
Antithrombin III	AT3	E
Apolipoprotein A I	APOA1	T
Apolipoprotein A II	APOA2	T
Apolipoprotein B	APOB	T
Apolipoprotein C1	APOC1	T
Apolipoprotein C2	APOC2	T
Apolipoprotein C3	APOC3	T
Apolipoprotein D	APOD	T
Apolipoprotein E	APOL	T
Apolipoprotein H	APOH	T
Archaete-scute homolog 2	ASH2	G
Arginase		
_	ARG1	E
Arginine vasopressin	ARG1 AVP	Ν
_	ARG1	

Arylsulfatase A Arylsulfatase B Arylsulfatase D Arylsulfatase E Arylsulfatase F Aspartoacylase Aspartylglucosaminidase Astrotactin Ataxia telangiectasia complementation group D	AGA ASTN	EEEEEEGG
Ataxia telangiectasia gene, AT ATP-binding cassette transporter 7 Atrial natriuretic peptide Atrial natriuretic peptide receptor A Atrial natriuretic peptide receptor B Atrial natriuretic peptide receptor C Bagpipe homeobox, drosophila homolog of, 1 beta-Glucuronidase beta-synuclein Bilirubin UDP-glucuronosyltransferase Bloom syndrome protein Bradykinin receptor B1 Bradykinin receptor B2 Brain derived neurotrophic factor (BDNF)	ABC7 ANP NPR1 NPR2 NPR3 BAPX1 GUSB SNCB BLM	G-GGGGEZEGGG
receptor Butyrylcholinesterase Ca(2+) transporting ATPase, slow twitch Cadherin E Cadherin EP Cadherin N Cadherin P Calbindin 1 Calbindin 1 Calbindin D9K Calcineurin A1 Calcineurin A2 Calcineurin A3 Calcineurin B Calcitonin/Calcitonin gene-related peptide	ATP2A2 CDH1 CDH2 CDH3 CALB1 CALB3 CALNA1 CALNA2 CALNA3	ETGGGGGIIIIN
alpha Calcium channel, voltage-dependent, alpha 1F subunit Calcium channel, voltage-dependent, Alpha- 1B (CACNL1A5) Calcium channel, voltage-dependent, Alpha- 1C	CACNA1B	N N N
Calcium channel, voltage-dependent, Alpha- 1D	CACNA1D	N

Calcium channel, voltage-dependent, Alpha- 1E (CACNL1A6)	CACNA1E	N
Calcium channel, voltage-dependent, Alpha- 2/delta	CACNA2	N
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3		N
Calcium channel, voltage-dependent, L type,		N
alpha 1S subunit		••
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	N
Calcium channel, voltage-dependent, P/Q	CACNA1A	N
type, alpha 1A subunit		•
Calcium channel, voltage-dependent, T-type	,	Ν
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CAMK2A	G
Calnexin	CANX	G
Calpain	CAPN, CAPN3	E
Calretinin	CALB2	N
Cannabinoid receptor	CNR1	N
Carbonic anhydrase 3	CA3	Ë
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	E
Cardiac-specific homeobox, CSX	CSX	G
Carnitine acetyltransferase	CRAT	E
Carnitine acylcarnitine translocase	CACT	Ē
Carnitine transporter protein	CDSP, SCD	T
Carnosinase	CDSF, SCD	Ņ
Caspase 1	CASP1	G
Catechol-O-methyltransferase	COMT	E
CD1	CD1	ī
CD4	CD4	i
Cell adhesion molecule, neural, NCAM1	NCAM1	Ġ
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Ceroid lipofuscinosis neuronal 2	CLN2	N
Ceroid lipofuscinosis neuronal 3	CLN3	N
Ceroid lipofuscinosis neuronal 4	CLN4	N
Ceroid lipofuscinosis neuronal 5	CLN5	N
Ceroid lipofuscinosis neuronal 6	CLN6	N
Chemokine receptor CCR2	CCR2	1 V
Chemokine receptor CCR2 Chemokine receptor CCR3	CCR3	ı
Chemokine receptor CCR5	CCR5	1
Chemokine receptor CXCR4	CXCR4	1
Chloride channel 1, skeletal muscle	CLCN1	S
Cholecystokinin	CCK	S N
OHOIGOYSIONIHIII	CON	M

Cholecystokinin B receptor	CCKBR	N
Choline acetyltransferase	CHAT	Ε
Choroideremia gene	CHM	S
Chromogranin A	CHGA	G
Chymotrypsinogen		E
Ciliary neurotrophic factor (CNTF)	CNTF	G
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	G
Clathrin		Т
CoA transferase		E
Cochlin	COCH	1
Cockayne syndrome gene, CKN1	CKN1	G
Cofilin		S
Collagen I alpha 1	COL1A1	S
Collagen I alpha 2	COL1A2	S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	s
Collagen IV alpha 1	COL4A1	S
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	S S S
Collagen IV alpha 4	COL4A4	Š
Collagen IV alpha 5	COL4A5	S
Collagen IV alpha 6	COL4A6	Š
Collagen IX alpha 2	COL9A2, EDM2	Š
Collagen IX alpha 3	COL9A3	Š
Collagen receptor	COLR	s
Collagen V alpha 1	COL5A1	s
Collagen V alpha 2	COL5A2	S
Collagen VI alpha 1	COL6A1	S
Collagen VI alpha 2	COL6A2	s
Collagen VI alpha 3	COL6A3	S
Collagen VII alpha 1	COL7A1	S
Collagen X alpha 1	COL10A1	S
Collagen X alpha 1	COL11A1	S
Collagen XI alpha 2	COL11A2	S
Collagen XVII alpha 1	COL17A1	s
Collagenic-like tail subunit of asymmetric	COLQ	Ē
acetylcholinesterase		_
Colony-stimulating factor 1	CSF1	G
Colony-stimulating factor 1 receptor	CSF1R	Ğ
Colony-stimulating factor 2	CSF2	Ğ
Colony-stimulating factor 2 alpha receptor	CSF2RA	Ğ
Colony-stimulating factor 2 beta receptor	CSF2RB	Ğ
Complex V	MTATP6	Ē
Cone-rod homeobox-containing gene	CRX	Ğ
Contactin	CNTN1	Ğ
Corticotrophin-releasing hormone	CRH	T
Corticotrophin-releasing hormone receptor	CRHR1	Ť
Creb binding protein	CREBBP	Ġ
oros sinaing protoni	ONEDDI	G

Cu2+ transporting ATPase beta polypeptide Cyclic AMP response element binding protein Cyclic AMP-dependent protein kinase Cyclic nucleotide gated channel alpha 1, CNGA1	CREB PKA	E G E N
Cyclic nucleotide gated channel alpha 3, CNGA3	CNGA3	N
CNGA3 Cyclic nucleotide phosphodiesterase 1B Cyclic nucleotide phosphodiesterase 1B1 Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4C Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclin-dependent kinase 2 Cyclooxygenase 1 Cyclooxygenase 2 CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A2 CYP1B1 CYP24 CYP27 CYP24 CYP27 CYP27 CYP27B1 CYP2A3 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C9 CYP2C9 CYP2D6 CYP2C9 CYP2D6 CYP2C9 CYP2D6 CYP2E1	PDE1B PDE1B1 PDE2A3 PDE3A PDE3B PDE4A PDE4C PDE5A PDE6B PDE7 PDE8 PDE9A CDK2 COX1 COX2 CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP24 CYP24 CYP27 PDDR CYP2A1	
CYP2F1	CYP2F1	Ε

·		
CYP2J2	CYP2J2	Ε
CYP3A3	CYP3A3	Ε
CYP3A4	CYP3A4	E
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	Ē
CYP4B1	CYP4B1	Ē
CYP4F2	CYP4F2	Ē
CYP4F3	CYP4F3	Ē
CYP51	CYP51	E
CYP5A1	CYP5A1	E
CYP7A	CYP7A	Ē
CYP8	CYP8	E
Cystathionase	CTH	Ē
Cystathione beta synthase	CBS	E
Cystatin B	CSTB	T
Cystatin C	CST3	Ť
Cystinosin	CTNS	Ť
Cytidine deaminase	CDA	Ė
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytochrome a	017.0	E
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	CSBP1	I
binding protein 1	30D. 1	•
Cytokine-suppressive antiinflammatory drug-	CSBP2	ı
binding protein 2	335, <u>2</u>	•
DAX1 nuclear receptor	DAX1	1
Deafness autosomal dominant 5	DFNA5	N
Deafness dystonia peptide	DDP	N
Deleted in malignant brain tumours 1	DMBT1	G
Delta aminolevulinate dehydratase	ALAD	E
Delta-7-dehydrocholesterol reductase	DHCR7	E
DHEA sulfotransferase	STD	Ē
Diaphanous 1	DIAPH1	N
Diaphanous 2	DIAPH2	N
Dihydrolipoamide branched chain	DBT	N
transacylase		14
Dihydrolipoamide dehydrogenase	DLD	N.
Dihydrolipoyl dehydrogenase 2	PDHA	E
Dihydrolipoyl transacetylase	PDHA	E
Dihydroxyacetonephosphate acyltransferase	DHAPAT	Ē
DNA glycosylases	5.04.74	E
DNA helicases		E
DNA Ligase 1	LIG1	E
DNA methyltransferase	DNMT	E
DOPA decarboxylase	DDC	E
Dopamine beta hydroxylase	DBH	E
- parimina a and right organization	וועט	Ľ

Dopamine receptors D1 Dopamine receptors D2 Dopamine receptors D3 Dopamine receptors D4 Dopamine receptors D5 Doublecortin, DCX Dynamin Dystonia 1 Dystonia 3 Dystonia 6 Dystonia 7 Dystonia 9	DRD1 DRD2 DRD3 DRD4 DRD5 DCX DNM1 DYT1 DYT3 DYT6 DYT7 CSE	N N N N N N S S S S S S S S S
Dystrophia myotonica Dystrophia myotonica, atypical	DM, DMPK DM2	E E
Dystrophin	DWD	S
Ectodermal Dysplasia 1 gene	ED1	S
Electron-transfering-flavoprotein alpha Electron-transfering-flavoprotein beta	ETFA ETFB	T T
Electron-transferring flavoprotein	ETFDH	Ė
dehydrogenase		
Emerin	EMD	· T
Empty spiracles (drosophila) homologue 1	EMX1	G
Empty spiracles (drosophila) homologue 2 Endobrevin	EMX2 VAMP8	G
Endothelin 1	EDN1	N N
Endothelin 2	EDN1	· N
Endothelin 3	EDN3	N
Endothelin converting enzyme	ECE1	N
Endothelin receptor type A	EDNRA	N
Endothelin receptor type B	EDNRB	N
Enolase	ENO1	Ε
Enoyl CoA isomerase		E
Enoyl CoA reductase		E
Enterokinase	PRSS7, ENTK	E
Ephrin-A	EFNA	G
Ephrin-B Epidermal growth factor	EFNB EGF	G G
Epidermal growth factor receptor	EGFR	G
Epilepsy, progressive myoclonic 2 gene	EPM2A	E
EWS RNA-binding protein	EWSR1	Ğ
Excision repair complementation group 4	ERCC4	E
protein		
Exostosin 1	EXT1	S
Exostosin 2	EXT2	S
Factor 1 (No. one)	F1	1
Factor III	F3 F9	1
Factor V	F5	1
·		•

•		
Factor VII	F7	1
Factor VIII	F8	i
Factor X	F10	i i
Factor XI	F11	i
Factor XII	F12	i
Factor XIII A & B	F13A & F13B	,
Fanconi anemia, complementation group A	FANCA	, T
Fanconi anemia, complementation group C	FANCC	Ţ
Fanconi anemia, complementation group D	FANCD	Ť
Fibrillin 2	FBN2	G
Fibrinogen alpha	FGA	S
Fibrinogen beta	FGB	S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
Flightless-II, Drosophila homolog of	FLII	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Forkhead transcription factor 10	FKHL10	G
Formiminotransferase		E
Fragile site, folic acid type, rare, fra(X) A	FRAXA	N
Fragile site, folic acid type, rare, fra(X) E	FRAXE	N
Fragile site, folic acid type, rare, fra(X) F	FRAXF	N
Frataxin	FRDA	G
Fructose-1,6-diphosphatase	FBP1	E
Fukuyama type congenital muscular	FCMD	Ğ
dystrophy		•
GABA receptor, alpha 1	GABRA1	N
GABA receptor, alpha 2	GABRA2	N
GABA receptor, alpha 3	GABRA3	N
GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	N
GABA receptor, beta 1	GABRB1	N
GABA receptor, beta 2	GABRB2	N
GABA receptor, beta 3	GABRB3	N
GABA receptor, gamma 1	GABRG1	N
GABA receptor, gamma 2	GABRG2	N
GABA receptor, gamma 3	GABRG3	N
GABA transaminase	ABAT	Е
Galactocerebrosidase	GALC	Ε
Galactose 1-phosphate uridyl-transferase	GALT	E
Galactosyltransferase 1	GT1	G
Galactosyltransferase, alpha 1,3	GGTA1	G
Galactosyltransferase, beta 3	B3GALT	G

Galanin Galanin receptor Gamma-glutamyltransferase 1 Gap junction protein beta 2 Gap junction protein beta 3 Gastric Intrinsic factor, GIF Gastrulation brain homeobox 2 Geniospasm 1 Gephyrin Glial-cell derived neurotrophic factor (GDNF) receptor	GAL GALNR1 GGT1 GJB2 GJB3 GIF GBX2 GSM1	N N T T T E G G N N
Glial-cell derived neurotrophic factor, GDNF	GDNF	N
Glucosidase, acid alpha	GAA	Ε
Glutamate decarboxylase, GAD	GAD1	Ε
Glutamate dehydrogenase	GLUD1	Ε
Glutamate receptor 1	GLUR1	Ν
Glutamate receptor 2	GLUR2	Ν
Glutamate receptor 3	GLUR3	Ŋ
Glutamate receptor 4	GLUR4	N
Glutamate receptor 5	GLUR5	N
Glutamate receptor 6	GLUR6	N
Glutamate receptor 7	GLUR7	N
Glutamate receptor, ionotropic, NMDA 1 Glutamate receptor, ionotropic, NMDA 2A	NMDAR1 NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2A Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	N N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
Glutamate-cysteine ligase	GLCLC	E
Glutaryi-CoA dehydrogenase	GCDH	E
Glutathione	GSH	T
Glutathione S-transferase, GSTZ1	GSTZ1	Е
Glutathione synthetase	GSS	Ε
Glyceraldehyde-3-phosphate	GAPDH	Ε
dehydrogenase, GAPDH		
Glycerol kinase	GK	Ε
Glycinamide ribonucleotide (GAR)	GART	Ε
transformylase	0.00	_
Glycine dehydrogenase	GLDC	E
Glycine receptor, alpha	GLRA2	N
Glycine receptor, beta	CLVT	N
Glycine transporter Glycogen phosphorylase	GLYT PYGL	N E
GM2 ganglioside activator protein, GM2A	GM2A	E
Gonadotropin releasing hormone receptor	GNRHR	G
GTP cylcohydrolase 1	GCH1	G
Guanidinoacetate N-methyltransferase	GAMT	E
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNAO1	N

Guanine nucleotide-binding protein, alpha	GNAI1	N
inhibiting activity polypeptide 1, GNAI1 Guanine nucleotide-binding protein, alpha	GNAI2	N
inhibiting activity polypeptide 2, GNAI2 Guanine nucleotide-binding protein, alpha	GNAI3	N
inhibiting activity polypeptide 3, GNAI3 Guanine nucleotide-binding protein, alpha	GNAS1	N
stimulating activity polypeptide, GNAS1 Guanine nucleotide-binding protein, alpha	GNAS2	N
stimulating activity polypeptide, GNAS2 Guanine nucleotide-binding protein, alpha	GNAS3	N
stimulating activity polypeptide, GNAS3 Guanine nucleotide-binding protein, alpha	GNAS4	N
stimulating activity polypeptide, GNAS4 Guanine nucleotide-binding protein, alpha	GNAT1	N
transducing activity polypeptide, GNAT1 Guanine nucleotide-binding protein, alpha	GNAT2	N
transducing activity polypeptide, GNAT2 Guanine nucleotide-binding protein, beta	GNB3	 N
polypeptide 3 Guanine nucleotide-binding protein, gamma	GNG5	Ň
polypeptide 5 Guanine nucleotide-binding protein, q	GNAQ	N
polypeptide Guanylate cyclase 2D, membrane (retina-	GUCY2D	E
specific) Guanylate cyclase activator 1A (retina)	GUCA1A	E
Guanylate kinase Guanylyl cyclase		E E
Gustducin, alpha (taste-specific G protein) Haeme regulated inhibitor kinase	GDCA	N E
Haemoglobin alpha 1	HBA1	· T
Haemoglobin alpha 2	HBA2	Т
Haemoglobin beta	HBB	Т
Haemoglobin delta	HBD	Т
Haemoglobin gamma A	HBG1	Т
Haemoglobin gamma B	HBG2	· T
Haemoglobin gamma G	HBGG	T
Heat shock protein, HSP60		I
Heat shock protein, HSP70		1
Heat shock protein, HSP90		1
Heat shock protein, HSPA1		1
Heat shock protein, HSPA2		1
Heparan sulfamidase		Ε
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	1
Hepatic lipase	LIPC	E
Hexosaminidase A	HEXA,TSD	Ē

Hexosaminidase B Hippocampal cholinergic neurostimulating per Histamine receptors, H1 Histamine receptors, H2 Histamine receptors, H3 Histidase	HEXB otide, HCNP	EZZZZE
HLA-B associated transcript 1	BAT1	ī
HLH transcription factor HAND1	HAND1	Ġ
HLH transcription factor HAND2	HAND2	G
HMG-CoA lyase	HMGCL	E
HMG-CoA reductase	HMGCR	Ē
Holocarboxylase synthetase	HLCS	Ē
Homeobox HB9	HLXB9	Ğ
Human atonal gene	ATOH1	Ğ
Hypoxanthine-guanine	HPRT	E
phosphoribosyltransferase, HGPRT		
Hypoxia inducible factor 1	HIF1A	E
Hypoxia inducible factor 2		Ē
IC7 A and B		Ī
Inositol 1,4,5-triphosphate receptor 1	ITPR1	G
Inositol monophosphatase	IMPA1	Ν
Inositol polyphosphate 1-phosphatase	INPP1	Ν
Insulin	INS	G
Insulin receptor	INSR	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 3	ITGB3	G
Integrin, alpha 1	ITGA1	G
Integrin, alpha M	ITGAM	G
Inter-alpha-trypsin inhibitor, IATI		Ε
Interleukin(IL) 1 receptor	IL1R	1
Interleukin(IL) 1, alpha	IL1A	1
Interleukin(IL) 1, beta	IL1B	İ
Interleukin(IL) 10	IL10	. 1 ,
Interleukin(IL) 10 receptor	IL10R	1.
Interleukin(IL) 11	IL11	l
Interleukin(IL) 11 receptor	IL11R	İ
Interleukin(IL) 12	IL12	ı
Interleukin(IL) 12 receptor, beta 1	IL12RB1	١
Interleukin(IL) 13	IL13	1
Interleukin(IL) 13 receptor	IL13R	1
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	!
Interleukin(IL) 2 receptor, gamma	IL2RG	1

Interleukin(IL) 3	IL3	1
Interleukin(IL) 3 receptor	IL3R	i
Interleukin(IL) 4	IL4	·
Interleukin(IL) 4 receptor	IL4R	i
Interleukin(IL) 5	IL5	i
Interleukin(IL) 5 receptor	IL5R	i
Interleukin(IL) 6	IL6	i
Interleukin(IL) 6 receptor	IL6R	,
Interleukin(IL) 7	IL7	i
Interleukin(IL) 7 receptor	IL7R	
Interleukin(IL) 8	IL8	. 1
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	
IP3 kinase		Ė
Isovaleric acid CoA dehydrogenase	IVD	E
Kallikrein 3	KAK3	Ī
Kallman syndrome gene 1	KAL1	Ġ
Ketohexokinase	KHK	E
Kininogen, High molecular weight	KNG	Ī
Kynureninease		Ė
L1 cell adhesion molecule	L1CAM	N
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta	LTBP2	G
binding protein 2	, =:=:=	•
Leptin	LEP	G
Leptin receptor	LEPR	G
Leukaemia inhibitory factor	LIF	G
Leukaemia inhibitory factor receptor	LIFR	G
Leukin		Ī
Leukocyte-specific transcript 1	LST-1	i
Leukotriene A4 hydrolase		i
Leukotriene A4 synthase	LTA4S	E
Leukotriene B4 receptor		Ī
Leukotriene B4 synthase	LTB4S	Ē
Leukotriene C4 receptor		Ī
Leukotriene C4 synthase	LTC4S	Ē
Leukotriene D4/E4 receptor		Ī
LIM homeobox protein 1	LHX1	Ġ
LIM homeobox protein 2	LHX2	Ğ
LIM homeobox protein 3	LHX3	Ğ
_IM homeobox protein 4	LHX4	G
imbic associated membrane protein	LAMP	G

LIM-domain only protein 1 LIM-domain only protein 2 LIM-domain only protein 3 LIM-domain only protein 4 LIM-Kinase I (LINK-I) Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, Intermediate Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Very Low Density Low density lipoprotein receptor-related	LMO1 LMO2 LMO3 LMO4 LDLR HDLDT1 VLDLR LRP	G G G I T T T T T T T T T
protein precursor Lymphoid enhancer-binding factor	LEF-1	
MAD (mothers against decapentaplegic, Drosophila) homologue 4 Malonyl CoA decarboxylase	MADH4	G G
Mannosidase, alpha B lysosomal Mannosidase, beta A lysosomal Marenostrin Melatonin receptor 1A Melatonin receptor 1B Methylguanine-DNA methyltransferase Methylmalonyl-CoA mutase Mevalonate kinase Microsomal triglyceride transfer protein Microtuble associated protein Mismatch repair gene, PMSL2 Molybdenum cofactor synthesis 1 Molybdenum cofactor synthesis 2 Monoamine oxidase A Monoamine oxidase B Msh homeobox homolog 2 Mucolipidoses Muscarinic receptor, M1 Muscarinic receptor, M2 Muscarinic receptor, M3 Muscarinic receptor, M4 Muscarinic receptor, M5 Myelin protein peripheral 22 Myelin protein zero	MANB MANBA MEFV MTNR1A MTNR1B MGMT MUT MVK MTP MAP PMS2 MOCS1 MOCS2 MAOA MAOB MSX2 GNPTA CHRM1 CHRM2 CHRM3 CHRM4 CHRM5 PMP22 MPZ	田田TNN田田田TのG田田田田田田田とNNNSの
Myogenic factor 3 Myogenic factor 4 Myogenic factor 5 Myosin 15 Myosin 6 Myosin 7A Myotubularin	MYF3 MYF4 MYF5 MYO15 MYO6 MYO7A MTM1	6668888

Na+, K+ ATPase, alpha	ATP1A1	^
Na+, K+ ATPase, beta 1		G
	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3	G
N-acetylglucosamine-6-sulfatase	GNS	Ε
N-acetylglucosaminidase, alpha	NAGLU	Ε
NADH dehydrogenase		Ε
NADPH-dependent cytochrome P450	POR	Ε
reductase		
NB6		l
Nebulin	NEB	S
Necdin	NDN	G
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neural retina-specific gene	NRL	G
Neuraminidase sialidase	NEU	Т
Neuregulin	HGL	G
Neurite growth-promoting factor 2	MDK	Ν
Neurite inhibitory protein		N
Neuroendocrine convertase 1	NEC1, PCSK1	Ε
Neurofibromin 1	NF1	G
Neurofibromin 2		G
Neurofilament protein, heavy		S
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68		S
Neurokinin A		N
Neurokinin B		N
Neuronal apoptosis inhibitory protein	NAIP	1
Neuronal molecule-1		1
Neuronal molecule-1 receptor		i
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1		N
Neuropeptide Y receptor Y2		N
Neurotensin		N
Neurotensin receptor		N
Neutral endopeptidase		E
Niemann-Pick disease protein		_ T
Nitric oxide synthase 1, NOS1		
Nitric oxide synthase 2, NOS2	NOS2	E E E
Nitric oxide synthase 3, NOS3	NOS3	<u>_</u>
Notch 1	NOTCH1	G
Notch 2		G
Notch 3		G
Notch ligand - jagged 1		G G
Nuclear factor I-kappa-B-like gene		
Nucleoside diphosphate kinase-A		
Oncogene bcl2		E
שומטשטווט שמוב	•	G

Oncogene GLI2 Oncogene GLI3 Oncogene GLI3 Oncogene sis Opioid receptor, delta Opioid receptor, kappa Opioid receptor, mu Ornithine delta-aminotransferase Ornithine transcarbamoylase Orthodenticle (Drosophila) homolog 1 Orthodenticle (Drosophila) homolog 2 Otoferlin Paired box homeotic gene 2 Paired box homeotic gene 3 Palmitoyl-protein thioesterase Parkin Patched (Drosophila) homolog, PTCH Peanut-like 1 Peptidylglycine alpha-amidating monooxygenase	GLI GLI2 GLI3 PDGFB OPRD1 OPRK1 OPRM1 OAT OTC, NME1 OTX1 OTX2 OTOF PAX2 PAX3 PPT PARK2 PTCH PNUTL1 PAM	G G G R R R E E G G R G G T R G – E
Peripherin, PRPH	,	S
Peroxisomal membrane protein 1	PXMP1	S
Peroxisomal membrane protein 3	PXMP3	Т
Peroxisome biogenesis factor 1	PEX1	T
Peroxisome biogenesis factor 19	PEX19	Т
Peroxisome biogenesis factor 6	PEX6	Т
Peroxisome biogenesis factor 7	PEX7	Т
Peroxisome receptor 1	PXR1	Т
Persyn		S
Phosphate regulating gene with homologies	PHEX	G
to endopeptidases on the X chromosome		
Phosphatidylinositol transfer protein	PITPN	G
Phosphoglucose isomerase	GPI	E
Phosphoglycerate kinase 1	PGK1	Ε
Phospholipase A2, group 10	PLA2G10	1
Phospholipase A2, group 1B	PLA2G1B	.]
Phospholipase A2, group 2A	PLA2G2A	. 1
Phospholipase A2, group 2B	PLA2G2B	
Phospholipase A2, group 4A	PLA2G4A	1
Phospholipase A2, group 4C	PLA2G4C	1
Phospholipase A2, group 5	PLA2G5	ſ
Phospholipase A2, group 6	PLA2G6	I
Phospholipase C alpha		
Phospholipase C beta	•	1
Phospholipase C delta	PLCD1	l
Phospholipase C epsilon		1
Phospholipase C gamma	PLCG1	1
Phosphomannomutase 2	PMM2	G

Phosphoribosyl pyrophosphate synthetase Phytanoyl-CoA hydroxylase Plakophilin 1 Plasminogen Plasminogen activator inhibitor 1 Plasminogen activator inhibitor 2 Plasminogen activator receptor, Urokinase Plasminogen activator, Tissue Plasminogen activator, Urokinase Platelet derived growth factor Platelet derived growth factor receptor	PRPS1 PHYH PKP1 PLG PAI1 PAI2 UPAR; PLAUR PLAT; TPA UPA; PLAU PDGF PDGFR	E G T E E E S E E G G
Platelet-activating factor receptor Plectin 1	PAFR	1
Postsynaptic density-95 protein	PLEC1 PSD95	T
Potassium channel, calcium-activated,	KCNN4	N N
Potassium channel, subfamily K, member 1	KCNK1	N N
Potassium channel, subfamily K, member 2	KCNK2	N
Potassium channel, subfamily K, member 3	KCNK3	N
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium voltage-gated channel A1	KCNA1	N
Potassium voltage-gated channel E1	KCNE1	N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	N
Potassium voltage-gated channel Q4	KCNQ4	N
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)	`	
POU domain, class 3, transcription factor 4	POU3F4	G
POU domain, class 4, transcription factor 3 Prekallikrein	POU4F3	G I
Preproenkephalin	PENK	N
Presenilin 1	PSEN1	Т
Presenilin 2	PSEN2	Т
Prion protein	PRNP	N
Procollagen N-protease	•	E
Proline dehydrogenase	PRODH	E
Pro-melanin-concentrating hormone	PMCH	G
Proopiomelanocortin	POMC	. 'N,
Prosaposin	PSAP	N
Prostacyclin synthase		J
Prostaglandin 15-OH dehydrogenase Prostaglandin D - DP receptor Prostaglandin E1 receptor	HGPD; PGDH	1
Prostaglandin E2 receptor		l 1
Prostaglandin E3 receptor		. 1
Prostaglandin F - FP receptor		. I
Prostaglandin I2 receptor		! T
Prostaglandin IP receptor		
<u></u>		1

Protease nexin 2 Protective protein for beta-galactosidase Protein C Protein C inhibitor Protein kinase C, alpha Protein kinase C, gamma Protein kinase G Protein phosphatase 1, regulatory (inhibitor) subunit 3	PN2 PPGB PROC PCI PRKCA PRKCG	
Protein S Prothrombin precursor Purine nucleoside phosphorylase Pyrroline-5-carboxylate synthetase Pyruvate carboxylase Pyruvate decarboxylase Ras-G-protein Rathke pouch homeobox, RPX Renin Replication factor C Retinal pigment epithelium specific protein (65kD)	PROS1 F2 NP PYCS PC PDHA RAS RPX REN RFC2 RPE65	
Retinaldehyde binding protein 1 Retinoblastoma 1 Rhodopsin kinase RIGUI S100 calcium-binding protein A1 S100 calcium-binding protein A2 S100 calcium-binding protein A3 S100 calcium-binding protein A4 S100 calcium-binding protein A5 S100 calcium-binding protein A6 S100 calcium-binding protein A7 S100 calcium-binding protein A8 S100 calcium-binding protein A9 S100 calcium-binding protein B S100 calcium-binding protein P Secretase, alpha	RLBP1 RB1 RHOK RIGUI S100A1 S100A2 S100A3 S100A4 S100A5 S100A6 S100A7 S100A8 S100A9 S100B	TGEGNNNNNNNNN
Secretase, beta Secretase, gamma Selectin E Selectin L Selectin P Semaphorin A4 Semaphorin A5 Semaphorin D Semaphorin E Semaphorin F Semaphorin W	SELE SELL SELP SEMA4 SEMA5 SEMAE SEMAE SEMA3/F SEMAW	X

· ·		
Serotonin N-acetyltransferase	SNAT	Ε
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4		N
Serotonin receptor, 5HT5	HTR4	N
Serotonin receptor, 5HT6	HTR5	N
Serotonin receptor, 5HT7	HTR6	N
Signaling lymphocyte activation molecule	HTR7	N
Slug protein	SLAM	1
	CALDDAL	G
Small nuclear ribonucleoprotein polypeptide N	SNRPN	S
	0.001014.4	
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1,	SCNN1G	N
gamma	00144	
Sodium channel, voltage gated, type IV,	SCN4A	N
alpha polypeptide	001115	
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		_
Solute carrier family 1 (amino acid	SLC1A6	T
transporter), member 6	01.0440	—
Solute carrier family 1 (glial high affinity	SLC1A3	T
glutamate transporter), member 3	0.044	_
Solute carrier family 1 (glutamate	SLC1A1	T
transporter), member 1		
Solute carrier family 1 (glutamate	SLC1A2	T
transporter), member 2		
Solute carrier family 12, member 1	SLC12A1	Т
Solute carrier family 12, member 2	SLC12A2	Т
Solute carrier family 12, member 3	SLC12A3	T
Solute carrier family 16 (monocarboxylate	SLC16A1	Т
transporter), member 1	•	
Solute carrier family 16 (monocarboxylate	SLC16A7	Т
transporter), member 7		
Solute carrier family 18, member 3	SLC18A3	Т
Solute carrier family 2 (facilitated glucose	SLC2A1	T
transporter), member 1		
Solute carrier family 20, member 3	SLC20A3	Т
Solute carrier family 25, member 12	SLC25A12	Т
Solute carrier family 4 (anion exchanger),	SLC4A1	Т

member 1		
Solute carrier family 4 (anion exchanger),	SLC4A2	Т
member 2		
Solute carrier family 4 (anion exchanger),	SLC4A3	Т
member 3		_
Solute carrier family 5 (sodium/glucose	SLC5A1	Т
transporter), member 1	CLOFAO	-\-
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	T
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5	JEOGAG	ı
Solute carrier family 5, member 3	SLC5A3	T
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ACID transporter), member	0200/11	'
1		
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		'
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		•
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		
Solute carrier family 6, member 6	SLC6A6	Т
Solute carrier family 7(amino acid	SLC7A1	Ť
transporter), member 1		•
Solute carrier family 7(amino acid	SLC7A2	T
transporter), member 2		
Solute carrier family 7(amino acid	SLC7A7	T
transporter), member 7		
Somatostatin	SST	Ν
Somatostatin receptor, SSTR1	SSTR1	Ν
Somatostatin receptor, SSTR2	SSTR2	G
Somatostatin receptor, SSTR3	SSTR3	Ν
Somatostatin receptor, SSTR4	SSTR4	N
Somatostatin receptor, SSTR5	SSTR5	Ν
Spastic paraplegia 7	SPG7	G
Spectrin beta	SPTB	S
Sphingomyelinase	SMPD1	Ε
Spinocerebellar ataxia 8 gene	SCA8	Ņ
SRY-box 11	SOX11	G
Steroid 5 alpha reductase 1	SRD5A1	E
Steroid 5 alpha reductase 2	SRD5A2	E
Steroid sulphatase	STS	E
Substance P		N
Succinic semi-aldehyde dehydrogenase	ssadh	E
Sulfamidase	SGSH	G
Sulfite oxidase	SUOX	E
Superoxide dismutase 1	SOD1	E
Superoxide dismutase 3	SOD3	Ε

Surfeit 1 Survival of motor neuron 1, telomeric Synapsin 1a & 1b Synapsin 2a & 2b Synaptic vesicle amine transporter Synaptic vesicle protein 2 Synaptobrevin 1 Synaptobrevin 2 Synaptogyrin	SURF1 SMN1 SYN1 SYN2 SVAT SV2 SYB1 SYB2		G T Z Z Z Z Z Z Z
Synaptophysin	SYP		N
Synaptosomal-associated protein, 25KD	SNAP25		N
Synaptotagmin 1	SYT1		N
Synaptotagmin 2	SYT2		N
Syntaxin 1	STX1		N
Tachykinin receptor, NK1R	TACR1		N
Tachykinin receptor, NK2R	TACR2		Ν
Tachykinin receptor, NK3R	TACR3		Ν
Talin	TLN		G
Tau protein	MAPT		S
TEK, tyrosine kinase, endothelial	TEK		Ε
Telomerase protein component			Ε
Thiolase, perioxisomal			E
Thrombin receptor	F2R		ı
Thrombopoietin	THPO		G
Thromboxane A synthase 1	TBXAS1		ŀ
Thromboxane A2	TXA2		!
Thromboxane A2 receptor	TBXA2R		I
Thy-1 T-cell antigen	THY1		1
Thyroxin-binding globulin	TBG		T
Tocopherol (alpha) transfer protein Topoisomerase I	TTPA		T
•	TIZOD		E
Torticollis, keloids, cryptorchidism and renal dysplasia gene	TKCR		G
Transacylase			_
Transferrin receptor	TFRC		E
Transforming growth factor, beta 2	TGFB2		G G
Transforming growth factor, beta induced	TGFBI		G
Transforming growth factor, beta receptor 2	TGFBR2	-	G
Transketolase-like 1	TKTL1	******	E
Transthyretin	TTR		T
Tremor, essential 1	ETM1		Ņ
Tremor, essential 2	ETM2		N
Triosephosphate isomerase	TPI1		E
Tropomyosin 3 (non-muscle)	TPM3		s
Tryptophan hydroxylase	TPH		Ē
Tubby-like protein 1	TULP1		Ğ
Tuberous sclerosis 1	TSC1		Ğ
Tuberous sclerosis 2	TSC2		G

Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	I
Tumour necrosis factor (TNF) receptor	TRAF2	i
associated factor 2		
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3		
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4	TD A CC	
Tumour necrosis factor (TNF) receptor	TRAF5	i
associated factor 5	TDAES	
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	i
Tumour necrosis factor alpha	TNFA	
Tumour necrosis factor alpha receptor	TNFAR	1
Tumour necrosis factor beta	TNFB	l l'
Tumour necrosis factor beta receptor	TNFBR	1
Tumour protein p53	TP53, P53	Ġ
Tumour protein p73	TP73	G
Tyrosine aminotransferase	TAT	E
Tyrosine hydroxylase	TH	Ē
Ubiquitin	•••	G
Ubiquitin B	UBB	G
Ubiquitin C	UBC	Ğ
Ubiquitin carboxyl-terminal esterase L1	UCHL1	Ğ
UDP-glucuronosyltransferase 1	ugt1d, UGT1	E
UDP-glucuronosyltransferase 2	UGT2	Ε
Urate oxidase	UOX	Ε
Uridinediphosphate(UDP)-galactose-4-	GALE	Ε
epimerase		
Uroporphyrinogen III synthase	UROS	Ε
Usher syndrome 2A	USH2A	S
Vacuolar proton pump, subunit 1	VPP1	Ν
Vacuolar proton pump, subunit 3	VPP3	Ν
Vasoactive intestinal polypeptide	VIP	Ν
Vasoactive intestinal polypeptide receptor	VIPR	Ν
Vesicular monoamine transporter 1	VMAT1	Ν
Vesicular monoamine transporter 2	VMAT2	Ν
Vitamin B12-binding (R) protein		G
Von Hippel-Lindau gene	VHL	G
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	G
Wolfram syndrome 1 gene	WFS1	S
Xanthine dehydrogenase	XDH	E
Xeroderma pigmentosum, complementation	XPA	E
group A	7100	_
Zinc finger protein 2	ZIC2	S

In a fourth aspect.

BEHAVIOURAL DISTURBANCE

The present invention relates to a method of assessing the risk of developing the symptoms of aggression and behavioural disturbance in patients with psychiatric or neuropsychiatric disorders or following traumatic brain injury, ischaemic brain damage or stroke.

Aggression, irritability and behavioural disturbance are major sources of disability in patients with psychiatric disorders or injury induced brain damage. Such symptoms lead to difficulties in the clinical care of patients, difficulties in the treatment and recovery of patients and lead to stress and anxiety in their carers and families.

Many studies have documented the appearance of aggression and irritability in a subset of patients following traumatic brain injury and also in patients with schizophrenia, depression, epilepsy and dementia (Youdofsky and Hales 1994, Lishman 1997) The biology underpinning the appearance of aggressive symptoms and behavioural disturbance in humans is uncertain and its genetic background unknown (OMIM Database 1998).

Explosive and violent behaviours are a known consequence of focal brain injury and diffuse damage to the central nervous system (Lishman 1997) and are referred to in DSM III-R as the organic personality syndrome. However, it is known that failure to control aggression and disturbed behaviours can occur in the absence of the personality disturbances specified in DSM-III-R.

Aggressive behaviours and associated behavioural disturbance are a relatively common feature of many neuropsychiatric disorders and can often arise in patients following traumatic brain injury, stroke or ischaemic damage following medical procedures.

It is presumed that a similar (although perhaps less extreme) physiology underlies the expression of aggression and behavioural disturbance in persons without the background of a diagnosable disease or psychiatric condition.

Although little is known concerning the pathophysiology of aggression and behavioural disturbance it has been observed that there is considerable inter-personal variation in the likelihood, threshold and magnitude of aggression or behavioural disturbance even in persons suffering from the same clinical condition or experiencing the same social or economic conditions.

It will be appreciated by those skilled in the art that a diagnosis of aggressive behaviours or behavioural disturbances can be made according to recognised criteria (e.g. BEHAVAD).

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

BEHAVIOURAL DISTURBANCE GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	. E
4-hydroxyphenylpyruvate dioxygenase	HPD	Ε
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	Ν
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	. N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	Ε
Adenylate cyclase 1	ADCY1	E
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	E
Adenylate cyclase 4	ADCY4	E
Adenylate cyclase 5	ADCY5	E
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	Ε
Adenylate cyclase 8	ADCY8	E
Adenylate cyclase 9	ADCY9	E
alpha-synuclein	SNCA	N
Amyloid beta A4 precursor protein	APP	N
Amyloid beta A4 precursor-like protein	APLP	N
Androgen binding protein	ABP	Т
Androgen receptor	AR	Ġ
Apolipoprotein E	APOE	T
Arginosuccinate synthetase	ASS	Ε
Ataxia telangiectasia gene, AT	ATM	G
beta-synuclein	SNCB	N

Ca(2+) transporting ATPase, slow twitch	ATP2A2	Т
Cannabinoid receptor	CNR1	N
Carbonic anhydrase 3	CA3	E
Carbonic anhydrase 4	CA4	Ē
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	E
Catechol-O-methyltransferase	COMT	E
Cholecystokinin	CCK	N
Cholecystokinin B receptor	CCKBR	N
Choline acetyltransferase	CHAT	E
Ciliary neurotrophic factor (CNTF)	CNTF	G
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	G
Corticotrophin-releasing hormone	CRH	T
Corticotrophin-releasing hormone receptor	CRHR1	Ť
Cryptochrome 1	CRY1	Ś
Cryptochrome 2	CRY2	S
Cu2+ transporting ATPase beta polypeptide	ATP7B	S E
Cyclic AMP-dependent protein kinase	PKA	E
Cyclooxygenase 1	COX1	E
Cyclooxygenase 2	COX2	
CYP11A1	CYP11A1	. Е Е
CYP11B1	CYP11B1	E
CYP11B2	CYP11B2	E
CYP17	CYP17	E
CYP19	CYP19	E
CYP1A1	CYP1A1	Ē
CYP1A2	CYP1A2	E
CYP1B1	CYP1B1	·E
CYP21	CYP21	E
CYP24	CYP24	E
CYP27	CYP27	E
CYP27B1	PDDR	Ē
CYP2A1	CYP2A1	Ē
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	E
CYP2A6V2	CYP2A6V2	Ē
CYP2A7	CYP2A7	Ē
CYP2B6	CYP2B6	, E.
CYP2C18	CYP2C18	 E
CYP2C19	CYP2C19	E
CYP2C8	CYP2C8	Ē
CYP2C9	CYP2C9	Ē
CYP2D6	CYP2D6	E
CYP2E1	CYP2E1	E
CYP2F1	CYP2F1	E
CYP2J2	CYP2J2	E
CYP3A3	CYP3A3	E
CYP3A4	CYP3A4	E
	O 11 OA4	⊏

CYP3A5 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP51 CYP5A1 CYP7A CYP8 Cystathionase Cystathione beta synthase Cytidine deaminase Cytidine-5-prime-triphosphate synthetase Cytochrome a Cytochrome c	CYP3A5 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP51 CYP5A1 CYP7A CYP8 CTH CBS CDA CTPS	
Cytochrome c oxidase, MTCO Dihydrolipoamide branched chain transacylase Dopamine beta hydroxylase Dopamine receptors D1 Dopamine receptors D2 Dopamine receptors D3 Dopamine receptors D4 Dopamine receptors D5 Doublecortin, DCX Enolase Flightless-II, Drosophila homolog of Fragile site, folic acid type, rare, fra(X) A Fragile site, folic acid type, rare, fra(X) F GABA receptor, alpha 1 GABA receptor, alpha 2 GABA receptor, alpha 3 GABA receptor, alpha 4 GABA receptor, alpha 5 GABA receptor, beta 1 GABA receptor, beta 1 GABA receptor, beta 2 GABA receptor, beta 3 GABA receptor, beta 3 GABA receptor, gamma 1 GABA receptor, gamma 2 GABA receptor, gamma 2 GABA receptor, gamma 3 Galactose 1-phosphate uridyl-transferase Geniospasm 1 Glutathione Glutathione S-transferase, GSTZ1 Glyceraldehyde-3-phosphate dehydrogenase,	DBT DBH DRD1 DRD2 DRD3 DRD4 DRD5 DCX ENO1 FLII FRAXA FRAXE FRAXF GABRA1 GABRA2 GABRA3 GABRA4 GABRA5 GABRA6 GABRB1 GABRB2 GABRB1 GABRB2 GABRB3 GABRB1 GABRB3 GABRG1 GABRG2 GABRG3 GALT GSM1 GSH GSTZ1 GAPDH	田乙田乙乙乙乙乙の田GZZZZZZZZZZZZZZLGT田田

·		
Glycerol kinase	GK	Е
Glycinamide ribonucleotide (GAR)	GART	Ē
transformylase		
GM2 ganglioside activator protein, GM2A	GM2A	Ε
Gustducin, alpha (taste-specific G protein)	GDCA	N
Inositol monophosphatase	IMPA1	N
IP3 kinase		Ε
Mannosidase, beta A lysosomal	MANBA	E
Melatonin receptor 1A	MTNR1A	N
Melatonin receptor 1B	MTNR1B	N
Monoamine oxidase A	MAOA	Ε
Monoamine oxidase B	MAOB	Ε
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	Ν
N-acetylglucosamine-6-sulfatase	GNS	Ε
NADPH-dependent cytochrome P450	POR	E
reductase		
Neurokinin A	NKNA	. N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Neurotensin	NTS	Ν
Neurotensin receptor	NTSR1	N
Nitric oxide synthase 1, NOS1	NOS1	Ε
Nitric oxide synthase 2, NOS2	NOS2	E
Nitric oxide synthase 3, NOS3 Ocular albinism 1	NOS3	Ē
	OA1	S
Opioid receptor, delta	OPRD1	N
Opioid receptor, kappa	OPRK1	N
Opioid receptor, mu Orexin	OPRM1	N
Orexin 1 receptor	OX	G
Orexin 1 receptor Orexin 2 receptor	OX1R	G
Phosphoglycerate kinase 1	OX2R	G
Potassium inwardly-rectifying channel J1	PGK1	E
Potassium voltage-gated channel E1	KCNJ1	N
Potassium voltage-gated channel Q1	KCNE1	N
Preproenkephalin	KCNQ1	N,
Preproglucagon	PENK	N
Prion protein	GCG;GLP1; GLP2	G
Proline dehydrogenase	PRNP	N
Pro-melanin-concentrating hormone	PRODH	E
Proopiomelanocortin	PMCH	G
Purine nucleoside phosphorylase	POMC	N
r armo nucieoside priosprioryiase	NP	Ε

DICLU	DIOLU	_
RIGUI	RIGUI	G
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	Ν
Serotonin receptor, 5HT5	HTR5	Ν
Serotonin receptor, 5HT6	HTR6	Ν
Serotonin receptor, 5HT7	HTR7	N
Solute carrier family 18, member 3	SLC18A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member 1	•	
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	T
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4	•	
Synapsin 1a & 1b	SYN1	Ν
Synapsin 2a & 2b	SYN2	Ν
Synaptogyrin		Ν
Synaptophysin	SYP	Ν
Synaptosomal-associated protein, 25KD	SNAP25	N
Syntaxin 1	STX1	N
Tachykinin receptor, NK1R	TACR1	N
Tachykinin receptor, NK2R	TACR2	N
Tachykinin receptor, NK3R	TACR3	N
Tau protein	MAPT	S
Tryptophan hydroxylase	TPH	Ē
	TH	E
Ubiquitin		G
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
UDP-glucuronosyltransferase 1	ugt1d, UGT1	E
UDP-glucuronosyltransferase 2	UGT2	E
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	N
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	N
Table in the strike polypopido receptor	VII 13	1.4

In a fifth aspect.

BRAIN INJURY

The present invention relates to a method of assessing the consequences and complications and the many symptoms arising as a result of sustaining brain damage.

The brain is one of the most complex organs in the body. Composed of nerve and support cells it is the substrate for cognition, behaviour and the formulation and execution of planned actions. The constant activity of brain cells ensures that the brain is one of the most energy and oxygen dependant organs in the body. Interruptions to the flow of oxygen or nutrients even for brief periods can result in damage to cells and long fibre tracts. Furthermore, the physical structure of the brain within the skull can also lead to vulnerability to damage. The brain is suspended in cerebro-spinal fluid (CSF), enclosed in a fixed rigidly confined space, the skull, and its closely applied tough, inelastic connective tissue, the dura matter. As such the finite space within the brain case has significant consequences for brain function when events occur which result in the available space being occupied by for example, tumour growth, or the accumulation of blood following a traumatic injury.

Hypoxia and Ischemic Lesions:

The brain is very sensitive both to global (hypoxia) and local (ischemia) reductions in blood and oxygen supply. Although the term's hypoxia and ischemia are used interchangeably, these conditions have different pathophysiology and consequences.

- Hypoxia: the blood flow to the CNS may be entirely normal or even increased.
 The greatest damage is caused in certain populations of neurones that are particularly vulnerable to hypoxia.
- Local brain ischemia: usually due to arterial stenosis or occlusion, any infarction is within the perfusion territory of the affected artery.
- Global brain ischemia: usually occurs when systemic blood pressure falls very low. Examples of causes include; cardiac tamponade, heroin overdose or intracranial pressure rises to a level that restricts perfusion of the brain e.g. after a head injury.

In practice, many causes of hypoxia (e.g. respiratory arrest or carbon monoxide poisoning) also depress cardiac output and so produce a combination of hypoxic and global ischemic brain injury. Common causes of hypoxia are, carbon monoxide poisoning, near drowning, respiratory arrest or prolonged status epilepticus. Common causes of ischaemia are cardiac arrest with prolonged asystole, hypotension due to myocardial infarction, cardiac tamponade, or major cardiac dysrhythmia, intraoperative hypotensive episode(s) or severe increases in intracranical pressure (Ellison D., Love S. et al,1998).

Vascular Disease and Infarcts.

An infarct is defined as an area in the brain tissue in which all cellular elements undergo necrosis (cell death), usually as a result of a cessation of flow of oxygenated blood to the region.

The clinical term 'stroke' describes a syndrome of sudden onset, non-epileptic, neurologic deficit that lasts more than 24 hours. Stroke has come to mean either brain infarction or haemorrhage.

Infarcts can be caused by:

- Large vessel or macrovascular (arterial) disease
- Small vessel or microvascular (arterial) disease
- Emboli
- Venus thrombosis

Strokes are worldwide in distribution and are common in the elderly, killing 150,000 Americans, making it the third leading cause of death in the USA. Twenty percent of strokes are haemorragic, resulting in bleeding into the brain. Ischaemic strokes, occurring when blood clots obstruct blood flow in vessels supplying blood to the brain, account for the remainder (Gunel M. and Lifton R.P, 1996).

Atherosclerosis is by far the leading systemic vasculopathy that produces brain infarcts, especially in older patients. It can affect both intracranial and extracranial large arteries. The major risk factors for Atherosclerosis include: age, family history, diabetes mellitus, cigarette smoking, hypertension and obesity.

Other large vessel diseases include; fibromuscular dysplasia (FMD), Moyamya disease, arterial dissection, HIV associated arteriopathies, cerebrovascular disease associated with antiphospholipid antibodies, angiitis and vascular affecting large arteries, giant cell arteritis and Takayasu's arteritis.

Small vessels in the brain can also be affected by arteriosclerosis, lipohyalinosis and amyloid angiopathy.

An 'embolic' stroke may result when any solid material forms within the arterial circulation, is introduced into the arterial circulation or forms in the venous circulation. Sources of brain emboli include atheroma, cardiogenic emboli (associated with cardiac pathology particularly in young people who are relatively free of Atherosclerosis), fat (often associated with fractures of long bones or the pelvis), neoplasm's and parasites or iatrogenic causes (e.g. air embolism can occur in decompression sickness and cardiac bypass surgery).

Cerebral venous thrombosis (CVT) is a much less common cause of stroke than arterial disease and causes include: infections (either intracranial or in adjacent facial and bony structures), head injury, neurosurgical procedures and neoplasm's.

The main causes of infarcts are mentioned above but twenty percent of strokes are haemorragic. The intracranial haemorrhage that occurs is the extravasation of blood into brain substance. Conditions associated with brain haemorrhage are; hypertension, trauma, cerebral amyloid angiopathy, berry aneurysm, vascular malformations, bleeding diathesis, illicit drug use, neoplasm's, infection and adverse events following drug or surgical interventions

Trauma:

Head injury, whether accidental, criminal, or suicidal, is the leading cause of death in people less than 45 years of age in developed countries. In the USA, an estimated 700,000 individuals each year sustain a severe head injury. Improvements in the acute management of trauma have led to an increase in the number of disabled survivors.

There are two main categories of head injury type, these are; non-missile or blunt head injury (the most common that is seen clinically) and missile head injury. The lesions that result can be divided according to their distribution i.e. focal or diffuse.

Focal lesions of the brain may lead to contusions, lacerations, haemorrhage or infection.

Diffuse brain damage is accounted for by the phenomena of diffuse axonal injury, diffuse vascular injury, raised intracranial pressure and ischaemic damage.

Particular groups of neurones or cells may be vulnerable to the additional processes of necrosis or apoptosis as a result of the pathological processes set in train by the brain injury.

Infection and Degeneration

Each of the above types of damage can also be caused by infections (e.g. HIV, rabies, prion disease, malarial parasites) or degenerative disease (e.g. Huntington chorea, Parkinson's disease, multiple sclerosis, dementia's).

CONSEQUENCES OF BRAIN INJURY

Brain damage due to disease or injury causes a range of reactions at a cellular level; neurone death, axonal degeneration, nuclear inclusions, neuronal cytoplasmic inclusions, structural abnormalities of axons, pathologic responses in astrocytes and microglia, inclusions in ependymal cells and choroid plexus epithelium and brain mineralization.

The long-term effects of brain injury result from the very limited capacity for repair and regrowth of these brain structures and the location and extent of the injury. Necrosis of several cubic centimetres of brain tissue may be clinically silent in the frontal lobe, severely disabling in the spinal cord, or fatal in the brain stem. The magnitude and distribution of the traumatic brain lesion obviously depend on the shape of the object causing the trauma, the force of the impact, and whether the head is in motion at the time of injury. Severe brain damage can occur in the absence of external signs of head injury, and conversely, severe lacerations and even skull fractures do not necessarily indicate damage to the underlying brain.

Brain injury is a very variable clinical entity and whilst many patients can make a good recovery from moderate head injuries or strokes a degree of residual deficit is common.

The actual range of deficits is very wide and encompasses a series of debilitating symptoms such as epilepsy, paralysis, blindness, deafness, dementia, psychiatric or

behavioural disturbances, personality and IQ changes to a persistent vegetative state (Gelder et al 1996, Lishman 1997). In addition the presence of a previous injury can confer additional vulnerabilities to the brain function of a person should they sustain experience any future incident of brain damage whether due to disease, trauma, infection or developmental anomaly.

Recent advances in neuroscience have begun to highlight new therapeutic approaches to treating brain injury. Treatment of ischaemic stroke with thrombolytic agents has recently showed modest benefit, but it underscores the importance of disease prevention for long term reduction in morbidity and mortality. The importance of hypertension in stoke pathogenesis has been shown by large prospective trials, demonstrating that treatment of hypertension reduces the risk of stroke by 40% (MacMahon et al., 1990). These observations raise the possibility that genetic predisposition may be important in the pathogenesis if stroke. Such predisposition may not only include genes contributing to elevated blood pressure but also genes acting independently of blood pressure.

Due to extremely limited regeneration of this tissue, long term clinical improvement following a stroke is minimal, commonly leaving stroke survivors with life-long disability. This high toll has a large economic and social impact on public health, with an estimated annual cost of stroke in the USA of \$30 billion.

More recent developments have included the concept of neuroprotection in the treatment of acute or chronic neurological disorders. An example of this is the research into glutamate, which suggests that raised levels of glutamate in the brain is potential neurotoxic and that glutamate antagonists can be neuroprotective. Many glutamate antagonists are currently under clinical evaluation in the treatment of stroke, head or spinal cord injury. Unfortunately, most of them currently have serious, largely behavioural side effects.

Side effects of treatments given for brain injury are of course undesirable, as in the case of glutamate antagonists, but more effective treatment will only become available when an understanding of the processes of brain damage and affect it has on the individual becomes clearer.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

BRAIN INJURY GENE LIST	HUGO symbol	Protein function
2,3-bisphosphoglycerate mutase	BPGM	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	Ē
4-hydroxyphenylpyruvate dioxygenase	HPD	Ē
5,10-methylenetetrahydrofolate reductase	MTHFR	E
(NADPH)		_
6-pyruvoyltetrahydropterin synthase	PTS	Ε
Acetoacetyl 2-CoA-thiolase	ACAT2	Ē
Acetyl CoA acyltransferase	ACAA	E ·
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	. N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	Ν
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	· N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Adducin, alpha	ADD1	S
Adducin, beta	ADD2	S
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3 Adenylate cyclase 1	ADORA3	N
Adenylate cyclase 2	ADCY1 ADCY2	E
Adenylate cyclase 3		E
Adenylate cyclase 4	ADCY3 ADCY4	E E
Adenylate cyclase 5	ADCY5	
Adenylate cyclase 6	ADCY6	E
Adenylate cyclase 7	ADCY7	E E
Adenylate cyclase 8	ADCY8	E .
Adenylate cyclase 9	ADCY9	E
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N
Adrenocorticotrophic hormone (ACTH)	ACTHR	G
receptor		.
Albumin, ALB	ALB	. Т

Aldehyde dehydrogenase 10 Aldosterone receptor Alpha 1 acid glycoprotein Alpha 2 macroglobulin alpha thalassemia gene alpha1-antitrypsin alpha2-antiplasmin alpha-synuclein Aminomethyltransferase Aminopeptidase P Amyloid beta (A4) precursor protein-binding, APBB1	ALDH10 MLR AAG; AGP A2M ATRX PI PLI SNCA AMT XPNPEP2 APBB1	EGT-ZEEZEEZ
Amyloid beta A4 precursor protein Amyloid beta A4 precursor-like protein Angiopoietin 1 Angiopoietin 2 Angiotensin converting enzyme Angiotensin receptor 1 Angiotensin receptor 2 Angiotensinogen Annexin 1 Antidiuretic hormone receptor Antithrombin III Apolipoprotein A II Apolipoprotein B Apolipoprotein C2 Apolipoprotein C3 Apolipoprotein E Apolipoprotein H Apoptosis antigen 1 Arginase Arginine vasopressin receptor 1A Arginine vasopressin receptor 1B Arginine vasopressin receptor 2 Arginosuccinate lyase Arginosuccinate synthetase Arylsulfatase D Arylsulfatase E Arylsulfatase F Aspartoacylase Ataxia telangiectasia gene, AT Atrial natriuretic peptide Atrial natriuretic peptide receptor A	APP APLP ANGPT1 ANGPT2 ACE, DCP1 AGTR1 AGTR2 AGT ANX 1 ADHR AT3 APOA1 APOA2 APOB APOC1 APOC2 APOC3 APOD APOE APOH APT1 ARG1 AVP AVPR1B AVPR2 ASL ASS ARSA ARSD ARSE ARSF ASPA ATM ANP NPR1	NNGGETTE-TETTTTTTT-ENNNNEEEEEEGGG

·		
Atrial natriuretic peptide receptor B Atrial natriuretic peptide receptor C	NPR2 NPR3	G G
Bagpipe homeobox, drosophila homolog of,	1 BAPX1	G
beta-synuclein	SNCB	Ν
Bleomycin hydrolase	BLMH	Ε
Bradykinin receptor B1		-
Bradykinin receptor B2		1
Brain derived neurotrophic factor	BDNF	G
Brain derived neurotrophic factor (BDNF)	BDNFR	G
receptor		
Butyrylcholinesterase	BCHE	E
Ca(2+) transporting ATPase, slow twitch	ATP2A2	T
Cadherin E	CDH1	G
Cadherin EP		G
Cadherin N	CDH2	G
Cadherin P	CDH3	Ğ
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	Ğ
Calcineurin A1	CALNA1	Ī
Calcineurin A2	CALNA2	i
Calcineurin A3	CALNA3	į
Calcineurin B		i
Calcitonin/Calcitonin gene-related peptide	CALCA	N
alpha		• •
Calcium channel, voltage-dependent, alpha	CACNA1F	N
1F subunit		•
Calcium channel, voltage-dependent, Alpha-	CACNA1B	Ν
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C		
Calcium channel, voltage-dependent, Alpha-	CACNA1D	Ν
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	Ν
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	Ν
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3	CACNB3	Ν
Calcium channel, voltage-dependent, L type,	CACNA1S	Ν
alpha 1S subunit		
Calcium channel, voltage-dependent,	CACNG2	Ν
Neuronal, Gamma		
Calcium channel, voltage-dependent, P/Q	CACNA1A	Ν
type, alpha 1A subunit	•	
Calcium channel, voltage-dependent, T-type		Ν
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	Ğ
Calmodulin 3	CALM3	G
		_

Calmodulin-dependant protein kinase II Calnexin Calpain Calretinin Carbonic anhydrase 3 Carbonic anhydrase 4 Carbonic anhydrase, alpha Carbonic anhydrase, beta Cardiac-specific homeobox, CSX Carnosinase	CAMK2A CANX CAPN, CAPN3 CALB2 CA3 CA4 CA1 CA2 CSX	GGENEEEG
Caspase 1	CASP1	N G
Caspase 10	CASP10	G
Caspase 2	CASP2	G
Caspase 3	CASP3	G
Caspase 4	CASP4	G
Caspase 5	CASP5	G
Caspase 6	CASP6	G
Caspase 7	CASP7	G
Caspase 8 Caspase 9	CASP8 CASP9	G
Catechol-O-methyltransferase	COMT	G E
CD1	CD1	ī
CD4	CD4	i
Cell adhesion molecule, intercellular, ICAM	ICAM1	Ġ
Cell adhesion molecule, leukocyte-	LECAM1	Ğ
endothelial, LECAM (CD62)		
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM1	G
Cell adhesion molecule, vascular, VCAM	VCAM1	G
Ceroid lipofuscinosis neuronal 2	CLN2	Ν
Ceroid lipofuscinosis neuronal 3	CLN3	N
Ceroid lipofuscinosis neuronal 4	CLN4	N
Ceroid lipofuscinosis neuronal 5	CLN5	N
Ceroid lipofuscinosis neuronal 6	CLN6	N
Chemokine receptor CXCR4	CXCR4	Ļ
Choline acetyltransferase	CHAT	E
Chymotrypsinogen Cockayne syndrome gene, CKN1 Cofilin	CKN1	G
Collagen i alpha 1	COL1A1	S S
Collagen I alpha 2	COL1A1	S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S
→		_

Collagen IV alpha 2 Collagen IV alpha 3 Collagen IV alpha 4 Collagen IV alpha 5 Collagen IV alpha 6 Collagen IX alpha 2 Collagen IX alpha 3 Collagen receptor Collagen V alpha 1 Collagen V alpha 2 Collagen VI alpha 2 Collagen VI alpha 2 Collagen VI alpha 3 Collagen VI alpha 3 Collagen VI alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen XI alpha 2 Collagen XVII alpha 1 Corticotrophin-releasing hormone Corticotrophin-releasing hormone Corticotrophin-releasing hormone receptor Creb binding protein Cu2+ transporting ATPase beta polypentide	COL4A2 COL4A3 COL4A4 COL4A5 COL4A6 COL9A2, EDM2 COL9A3 COLR COL5A1 COL5A2 COL6A1 COL6A2 COL6A3 COL7A1 COL10A1 COL11A1 COL11A2 COL17A1 CRH CRHR1 CREBBP ATP7R	888888888888888FFG
•		5
•		S
Collagen receptor		s
Collagen V alpha 1	COL5A1	
Collagen V alpha 2	COL5A2	
Collagen VI alpha 1	COL6A1	S
Collagen VI alpha 2	COL6A2	
Collagen VI alpha 3	COL6A3	S
Collagen VII alpha 1	COL7A1	S
- ,	COL10A1	S
-	COL11A1	
	COL11A2	S
	COL17A1	
	CRH	T
.		
Cu2+ transporting ATPase beta polypeptide	ATP7B	Ε
Cyclic AMP-dependent protein kinase	PKA	Ε
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	Е
Cyclic nucleotide phosphodiesterase 3A	PDE3A	E
Cyclic nucleotide phosphodiesterase 3B	PDE3B	Ε
Cyclic nucleotide phosphodiesterase 4A	PDE4A	Ε
Cyclic nucleotide phosphodiesterase 4C	PDE4C	E
Cyclic nucleotide phosphodiesterase 5A	PDE5A	E
Cyclic nucleotide phosphodiesterase 6A	PDE6A	E
Cyclic nucleotide phosphodiesterase 6B	PDE6B	Ε
Cyclic nucleotide phosphodiesterase 7	PDE7	Ε
Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A	PDE8	Ε
	PDE9A	E
Cyclooxygenase 1 Cyclooxygenase 2	COX1	E
CYP11A1	CYP11A1	E E
CYP11B1	CYP11B1	.E
CYP11B2	CYP11B1	. E.
CYP17	CYP17	E
CYP19	CYP19	E
CYP1A1	CYP1A1	E
CYP1A2	CYP1A2	Ē
CYP1B1	CYP1B1	Ē
CYP21	CYP21	Ē
CYP24	CYP24	Ē
CYP27	CYP27	Ē
CYP27B1	PDDR	E

CYP2A13 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C19 CYP2C8 CYP2C9 CYP2D6 CYP2E1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP51 CYP5A1 CYP5A1 CYP5A1 CYP5A1 CYP5A1 CYP5A2 CYP5A CYP5A2 CYP5A3 CYP5A3 CYP5A3 CYP5A1 CYP6C CYP6C CYP6C CYP6C CYP6C CYP6C CYP6C CYP6C CYP6C CYP6C CYP6C CYP6C CYPCC YPCC YPCC CYPC	CYP2A1 CYP2A13 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C19 CYP2C8 CYP2C9 CYP2D6 CYP2E1 CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP5A1 CYP7A CYP8 CSTB CST3 CTPS	
binding protein 1		
Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2	ı
DAX1 nuclear receptor	DAX1	1
Deleted in malignant brain tumours 1	DMBT1	G
Delta-7-dehydrocholesterol reductase	DHCR7	Ε
Dihydrolipoamide branched chain	DBT	Ν
transacylase Dihydroxyacetonephosphate acyltransferase	DHAPAT	Ε
Dopamine beta hydroxylase	DBH	E
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	N
Dopamine receptors D5	DRD5	N
		. 4

Dystrophia myotonica Dystrophia myotonica, atypical Dystrophin Ectodermal Dysplasia 1 gene Empty spiracles (drosophila) homologue 1 Empty spiracles (drosophila) homologue 2 Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Enolase Epidermal growth factor Epidermal growth factor receptor Epilepsy, benign neonatal 4 gene Epilepsy, female restricted Epilepsy, progressive myoclonic 2 gene Excision repair complementation group 4 protein	CSE DM, DMPK DM2 DMD ED1 EMX1 EMX2 EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB ENO1 EGF EGFR ICCA EFMR EPM2A ERCC4	SEESSGGNNNNNEGGEEEE
Factor 1 (No. one)	F1	ı
Factor III	F3	i
Factor IX	F9	ı
Factor V	F5	1
Factor VII	F7	1
Factor VIII	F8	1
Factor X	F10	1
Factor XI	F11	- 1
Factor XII	F12	1
Factor XIII A & B	F13A & F13B	1
Fanconi anemia, complementation group C	FANCC	T
Fanconi anemia, complementation group D	FANCD	T
Fibrinogen alpha	FGA	S
Fibrinogen beta	FGB	S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
Flightless-II, Drosophila homolog of	FLII	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH Formiminotransferase	FSHB	G
Fragile site, folic acid type, rare, fra(X) A		Ε
Fragile site, folic acid type, rare, fra(X) F	FRAXA FRAXE	N
Fragile site, folic acid type, rare, fra(X) F	FRAXE	N
- 1-5.10 one, ione dold type, raie, ira(X) i	LIVVII .	Ν

Frataxin	FRDA		G
Fukuyama type congenital muscular	FCMD		G
dystrophy	•		
Fumarase	FH	•	Ε
GABA receptor, alpha 1	GABRA1		Ν
GABA receptor, alpha 2	GABRA2		Ν
GABA receptor, alpha 3	GABRA3		N
GABA receptor, alpha 4	GABRA4		N
GABA receptor, alpha 5	GABRA5		N
GABA receptor, alpha 6	GABRA6		N
GABA receptor, beta 1	GABRB1		N
GABA receptor, beta 2	GABRB2		N
GABA receptor, beta 3	GABRB3	•	N
GABA receptor, gamma 1	GABRG1	*	N
GABA receptor, gamma 2	GABRG2		N
GABA receptor, gamma 3	GABRG3		N
GABA transaminase	ABAT	•	
Galactosyltransferase 1	GT1		E G
	GGTA1	•	
Galactosyltransferase, alpha 1,3			G
Galactosyltransferase, beta 3	B3GALT		G
Galanin	GALNE		N
Galanin receptor	GALNR1		N
Gamma-glutamyltransferase 1	GGT1		T
Gastric Intrinsic factor, GIF	GIF		E
GDP dissociation inhibitor 1	GDI1		G
Glial-cell derived neurotrophic factor (GDNF)			N
receptor			
Glial-cell derived neurotrophic factor, GDNF	GDNF	•	N
Glioma chloride ion channel, GCC			G
Glutamate decarboxylase, GAD	GAD1		Ε
Glutamate receptor 1	GLUR1		Ν
Glutamate receptor 2	GLUR2		N
Glutamate receptor 3	GLUR3	•	Ν
Glutamate receptor 4	GLUR4		N
Glutamate receptor 5	GLUR5		Ν
Glutamate receptor 6	GLUR6		N
Glutamate receptor 7	GLUR7		Ν
Glutamate receptor, ionotropic, NMDA 1	NMDAR1		N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A		Ν
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B		Ν
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C		Ν
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D		N
Glutaryl-CoA dehydrogenase	GCDH		E
Glutathione	GSH		T
Glutathione S-transferase, GSTZ1	GSTZ1		Ė
Glutathione synthetase	GSS		Ē
Glyceraldehyde-3-phosphate	GAPDH		E
dehydrogenase, GAPDH			_

Glycinamide ribonucleotide (GAR) transformylase Glycine dehydrogenase Glycine Glycine Glycine dehydrogenase Glycine Glycine Glycine dehydrogenase Glycine Gl	Glycerol kinase	GK	Ε
transformylase Glycine dehydrogenase Glycine dehydrogenase Glycine dehydrogenase Glycine dehydrogenase GM2 ganglioside activator protein, GM2A Gonadotropin releasing hormone receptor GTP cylcohydrolase 1 Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO Guanylate cyclase 2D, membrane (retina- specific) Guanylate cyclase activator 1A (retina) Guanylyl cyclase Haeme regulated inhibitor kinase Haeme regulated inhibitor kinase Haeme regulated inhibitor kinase Haemoglobin alpha 1 Haemoglobin beta Haemoglobin beta Haemoglobin delta Haemoglobin gamma A Haemoglobin gamma B Haedoglobin gamma B Haenoglobin gamma B Haenoglobin gamma G Haeparin binding epidermal growth factor Heparin binding epidermal growth factor Heparin Cofactor II Hepatic lipase Hexosaminidase A HEXA,TSD E Hexosaminidase B Histamine receptors, H2 Histamine receptors, H3 Histamine receptors, H3 Histamine receptors, H3 Histamine receptors, H3 Histamine receptors, H3 Histamine receptors, H3 Histopsencephaly 1 Holoprosencephaly 2 HPE1 G Holoprosencephaly 3 HPE3 G HPE4 G HPE4 G HPP5 G HOloprosencephaly 4 HPP64 G Hypoxia inducible factor 1 HIF1A E HI	· ·		
Glycine dehydrogenase GM2 ganglioside activator protein, GM2A GM2A GM2A GM2A GM2A GM2A GM2A GM2A	• •		
GM2 ganglioside activator protein, GM2A Gonadotropin releasing hormone receptor GTP cylcohydrolase 1 Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO Guanylate cyclase 2D, membrane (retina- specific) Guanylate cyclase activator 1A (retina) Guanylyl cyclase Haeme regulated inhibitor kinase Haemoglobin alpha 1 Haemoglobin lapha 2 Haemoglobin beta Haemoglobin odetta Haemoglobin gamma A Haemoglobin gamma B Haemoglobin gamma G Haeparin binding epidermal growth factor Heparin Cofactor II Hepatic lipase Hexosaminidase A Hexosaminidase A Hexosaminidase B Histamine receptors, H2 Histamine receptors, H3 Histamine receptors, H3 Histidase HCA HOCR HOCR HOCR HOCR HOCR HOCR HOCR HOCR	Glycine dehydrogenase	GLDC	E
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Holoprosencephaly 1 Holoprosencephaly 2 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 2 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 4 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 4 Holopr	HMG-CoA reductase	HMGCR	Ε
Holoprosencephaly 2 Holoprosencephaly 3 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 4 Holoprosencephaly 3 Holoprosencephaly 4 Holopr		HLCS	Ε
Holoprosencephaly 3 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 4 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 3 Holoprosencephaly 4 Holopr	Holoprosencephaly 1	HPE1	G
Holoprosencephaly 4 HPE4 G Hypoxia inducible factor 1 HIF1A E Hypoxia inducible factor 2 E IC7 A and B I Inositol 1,4,5-triphosphate receptor 1 ITPR1 G Inositol monophosphatase IMPA1 N Insulin INS G Insulin receptor INSR G Insulin-like growth factor 1 IGF1 G Insulin-like growth factor 1 receptor IGF1R	· · · · · · · · · · · · · · · · · · ·	HPE2	G
Hypoxia inducible factor 1 HIF1A E Hypoxia inducible factor 2 E IC7 A and B I Inositol 1,4,5-triphosphate receptor 1 ITPR1 G Inositol monophosphatase IMPA1 N Insulin INS G Insulin receptor INSR G Insulin-like growth factor 1 IGF1 G Insulin-like growth factor 1 receptor IGF1R	•	HPE3	G
Hypoxia inducible factor 2 IC7 A and B Inositol 1,4,5-triphosphate receptor 1 Inositol monophosphatase IMPA1 Insulin INS G Insulin receptor INSR G Insulin-like growth factor 1 IGF1 G IGF1R G	•	HPE4	G .,
IC7 A and B Inositol 1,4,5-triphosphate receptor 1 Inositol monophosphatase IMPA1 Insulin INS G Insulin receptor INSR G Insulin-like growth factor 1 Insulin-like growth factor 1 IGF1 G Insulin-like growth factor 1 IGF1 G	Hypoxia inducible factor 1	HIF1A	Ε
Inositol 1,4,5-triphosphate receptor 1 ITPR1 G Inositol monophosphatase IMPA1 N Insulin INS G Insulin receptor INSR G Insulin-like growth factor 1 IGF1 G Insulin-like growth factor 1 receptor IGF1R G	Hypoxia inducible factor 2		Ε
Inositol monophosphataseIMPA1NInsulinINSGInsulin receptorINSRGInsulin-like growth factor 1IGF1GInsulin-like growth factor 1 receptorIGF1RG	IC7 A and B		1
InsulinINSGInsulin receptorINSRGInsulin-like growth factor 1IGF1GInsulin-like growth factor 1 receptorIGF1RG	Inositol 1,4,5-triphosphate receptor 1	ITPR1	G
Insulin receptor INSR G Insulin-like growth factor 1 IGF1 G Insulin-like growth factor 1 receptor IGF1R G	Inositol monophosphatase	IMPA1	Ν
Insulin-like growth factor 1 IGF1 G Insulin-like growth factor 1 receptor IGF1R G	Insulin	INS	G
Insulin-like growth factor 1 IGF1 G Insulin-like growth factor 1 receptor IGF1R G	•	INSR	G
Insulin-like growth factor 1 receptor IGF1R G	-	IGF1	G
	· ·	IGF1R	
	Insulin-like growth factor 2	IGF2	

Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 3	ITGB3	G
Integrin beta 4	ITGB4	G
Integrin beta 5	ITGB5	G
Integrin beta 6	ITGB6	G
Integrin beta 7	ITGB7	Ğ
Integrin, alpha 1	ITGA1	Ğ
Integrin, alpha 2	ITGA2	Ğ
Integrin, alpha 3	ITGA3	Ğ
Integrin, alpha 4	ITGA4	Ğ
Integrin, alpha 5	ITGA5	Ğ
	ITGA6	Ğ
Integrin, alpha 6	ITGA7	G
Integrin, alpha 7	ITGA7	G
Integrin, alpha 8	ITGA9	G
Integrin, alpha 9		G
Integrin, alpha M	ITGAM	
Integrin, alpha X	ITGAX	G E
Inter-alpha-trypsin inhibitor, IATI	11.40	
Interleukin(IL) 1 receptor	IL1R	-
Interleukin(IL) 1, alpha	IL1A	-
Interleukin(IL) 1, beta	IL1B	- !
Interleukin(IL) 10	IL10	1
Interleukin(IL) 10 receptor	IL10R	!
Interleukin(IL) 11	IL11	!
Interleukin(IL) 11 receptor	IL11R	1
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	1
Interleukin(IL) 13	IL13	1
Interleukin(IL) 13 receptor	IL13R	
Interleukin(IL) 2	IL2	-
Interleukin(IL) 2 receptor, alpha	IL2RA	ı
Interleukin(IL) 2 receptor, gamma	IL2RG	-
Interleukin(IL) 3	IL3	i
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	1
Interleukin(IL) 4 receptor	IL4R	ı
Interleukin(IL) 5	IL5	l
Interleukin(IL) 5 receptor	IL5R	1
Interleukin(IL) 6	IL6	-
Interleukin(IL) 6 receptor	IL6R	ı
Interleukin(IL) 7	IL7	İ
Interleukin(IL) 7 receptor	IL7R	-
Interleukin(IL) 8	IL8	1
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	1
· , ,		

Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	. 1
IP3 kinase		Ε
Kallikrein 3	KAK3	i
Kininogen, High molecular weight	KNG	i
Kynureninease	11110	Ë
Laminin 5, alpha 3	LANAA	
•	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta	LTBP2	G
binding protein 2		
Leptin	LEP	G
Leptin receptor	LEPR	G
Leukin	LL! IX	9
	LOTA	!
Leukocyte-specific transcript 1	LST-1	!
Leukotriene A4 hydrolase		j
Leukotriene A4 synthase	LTA4S	E
Leukotriene B4 receptor		1
Leukotriene B4 synthase	LTB4S	E
Leukotriene C4 receptor		1
Leukotriene C4 synthase	LTC4S	E
Leukotriene D4/E4 receptor		J
LIM homeobox protein 1	LHX1	G
LIM-Kinase I (LINK-I)		Ī
Lipocortin 1	ANX4	i
Lipoprotein lipase	LPL	i
Lipoprotein receptor, Low Density	LDLR	Ť
Lipoprotein, High Density	HDLDT1	
· · · · · · · · · · · · · · · · · · ·	חטבטוו .	. T
Lipoprotein, Intermediate Density		Ţ
Lipoprotein, Low Density 1		<u>T</u>
Lipoprotein, Low Density 2		Т
Lipoprotein, Very Low Density	VLDLR	Т
Lipoprotein-associated coagulation factor	LACI	i
Low density lipoprotein receptor-related	LRP	Т
protein precursor		
Lymphoid enhancer-binding factor	LEF-1	G
MAD (mothers against decapentaplegic,	MADH4	G.
Drosophila) homologue 4	W. C. C.	
Malonyl CoA decarboxylase		Ë
Mannosidase, alpha B lysosomal	MANB	E
Mannosidase, beta A lysosomal	MANBA	E
Methionine synthase	MTR	E
Methylmalonyl-CoA mutase	MUT	Ε
Mevalonate kinase	MVK	E
Mismatch repair gene, PMSL2	PMS2	G
Molybdenum cofactor synthesis 1	MOCS1	E
Molybdenum cofactor synthesis 2	MOCS2	E
, -, -, -,		_

Monoamine oxidase A Monoamine oxidase B Mucolipidoses Muscarinic receptor, M1 Muscarinic receptor, M2 Muscarinic receptor, M3 Muscarinic receptor, M4 Muscarinic receptor, M5 Myelin basic protein N-acetylglucosamine-6-sulfatase	MAOA MAOB GNPTA CHRM1 CHRM2 CHRM3 CHRM4 CHRM5	田田田NNNNS田田田
N-acetylglucosaminidase, alpha	NAGLU	Ε
NADPH-dependent cytochrome P450 reductase	POR	E
NB6		1
Nerve growth factor .	NGF	G
Nerve growth factor receptor	NGFR	G
Neurite inhibitory protein		Ν
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68	NF68	S
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY NPV1P	N
Neuropeptide Y receptor Y1	NPY1R NPY2R	N
Neuropeptide Y receptor Y2 Nitric oxide synthase 1, NOS1	NOS1	N E
Nitric oxide synthase 1, NOS1	NOS1	E
Nitric oxide synthase 3, NOS3	NOS3	E
Notch 3	NOTCH3	G
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL	Ĭ
Nucleoside diphosphate kinase-A	NDPKA	Ė
Oncogene bcl2		G
Oncogene sis	PDGFB	Ğ
Ornithine delta-aminotransferase	OAT	Ē
Ornithine transcarbamoylase	OTC, NME1	E
Orthodenticle (Drosophila) homolog 1	OTX1	G
Orthodenticle (Drosophila) homolog 2	OTX2	G
Patched (Drosophila) homolog, PTCH	PTCH	G
Peroxisomal membrane protein 1	PXMP1	S
Peroxisomal membrane protein 3	PXMP3	Т
Peroxisome biogenesis factor 1	PEX1	Т
Peroxisome biogenesis factor 19	PEX19	Т
Peroxisome biogenesis factor 6	PEX6	Т
Peroxisome biogenesis factor 7	PEX7	Т
Peroxisome receptor 1	PXR1	Т

Persyn		S
Phosphoglucose isomerase	GPI	Ē
Phosphoglycerate kinase 1	PGK1	Ē
Phospholipase A2, group 10	PLA2G10	ī
Phospholipase A2, group 1B	PLA2G1B	i
· · · · · · · · · · · · · · · · · · ·	PLA2G2A	i
Phospholipase A2, group 2A	PLA2G2B	1
Phospholipase A2, group 2B	PLA2G2B PLA2G4A	1
Phospholipase A2, group 4A		1
Phospholipase A2, group 4C	PLA2G4C	ı
Phospholipase A2, group 5	PLA2G5	1
Phospholipase A2, group 6	PLA2G6	!
Phospholipase C alpha		!
Phospholipase C beta		!
Phospholipase C delta	PLCD1	l
Phospholipase C epsilon		l l
Phospholipase C gamma	PLCG1	1
Phosphomannomutase 2	PMM2	G
Plasminogen	PLG	E
Plasminogen activator inhibitor 1	PAI1	E E S
Plasminogen activator inhibitor 2	PAI2	Ε
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	
Plasminogen activator, Tissue	PLAT; TPA	Ε
Plasminogen activator, Urokinase	UPA; PLAU	Ε
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Platelet glycoprotein 1b, alpha	GP1BA	1
Platelet glycoprotein 1b, beta	GP1BB	1
Platelet glycoprotein 1b, gamma	GP1BG	1
Platelet glycoprotein IX	GP9	1
Platelet glycoprotein V	GP5	1
Platelet-activating factor acetylhydrolase 1B	PAFAH1B1 or	1
Takelet delivering reduct decrying a ciece 12	LIS1	-
Platelet-activating factor acetylhydrolase 2	PAFAH2	1
Platelet-activating factor receptor	PAFR	i
Plectin 1	PLEC1	Ť
Polycystin 1	PKD1	Ť
Polycystin 2	PKD2	Ť
	KCNJ1	. N .
Potassium inwardly-rectifying channel J1	KCNE1	N
Potassium voltage-gated channel E1		N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	
Potassium voltage-gated channel Q3	KCNQ3	N
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)		
Prekallikrein		i
Prion protein	PRNP	N
Procollagen N-protease		E
Proline dehydrogenase	PRODH	E

Donasta i I i i ita	DOMO	
Proopiomelanocortin	POMC	Ņ
Prostacyclin synthase	HCDD, DCDH	
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	!
Prostaglandin D - DP receptor		1
Prostaglandin E1 receptor		1
Prostaglandin E2 receptor		1
Prostaglandin E3 receptor		-
Prostaglandin F - FP receptor		T
Prostaglandin I2 receptor Prostaglandin IP receptor		!
Protective protein for beta-galactosidase	PPGB	_
Protein C	PROC	E
Protein C inhibitor	PCI .	1
Protein kinase C, alpha	PRKCA .	_
Protein kinase C, gamma	PRKCG	E
Protein kinase G, gamma Protein kinase G	TRICO	E
Protein phosphatase 1, regulatory (inhibitor)	PPP1R3	Ē
subunit 3	111110	_
Protein S	PROS1	1
Prothrombin precursor	F2	i
Purine nucleoside phosphorylase	NP	Ė
Pyrroline-5-carboxylate synthetase	PYCS	E
Pyruvate carboxylase	PC	E
Ras-G-protein	RAS	G
Renin	REN	Ε
Replication factor C	RFC2	Ε
RIGUI	RIGUI	G
S100 calcium-binding protein A1	S100A1	Ν
S100 calcium-binding protein A2	S100A2	Ν
S100 calcium-binding protein A3	S100A3	Ν
S100 calcium-binding protein A4	S100A4	Ν
S100 calcium-binding protein A5	S100A5	Ν
S100 calcium-binding protein A6	S100A6	Ν
S100 calcium-binding protein A7	S100A7	Ν
S100 calcium-binding protein A8	S100A8	N
\$100 calcium-binding protein A9	S100A9	N
S100 calcium-binding protein B	S100B	N
S100 calcium-binding protein P.	\$100P	N
Secretase, alpha	•	N
Secretase, beta		N
Secretase, gamma	OF! F	N
Selectin E	SELE	N
Selectin L	SELL	N
Selectin P	SELP	N
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A Serotonin receptor, 5HT1B	HTR1A HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N N
Serotoliii receptor, SITT TO	HINIU	IA

Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1,	SCNN1G	
gamma	SCIVILIA	Ν
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide		
Solute carrier family 1 (glutamate	SLC1A1	Τ
transporter), member 1		
Solute carrier family 1 (glutamate	SLC1A2	Т
transporter), member 2		
Solute carrier family 12, member 1	SLC12A1	T
Solute carrier family 12, member 2	SLC12A2	T
Solute carrier family 12, member 3	SLC12A3	T
Solute carrier family 16 (monocarboxylate	SLC16A1	Т
transporter), member 1 Solute carrier family 16 (monocarboxylate	CI C46A7	~~
transporter), member 7	SLC16A7	Т
Solute carrier family 18, member 3	SLC18A3	Т
Solute carrier family 2 (facilitated glucose	SLC2A1	Ť
transporter), member 1	SEOZ/(I	•
Solute carrier family 20, member 3	SLC20A3	Т
Solute carrier family 5 (sodium/glucose	SLC5A1	Ť
transporter), member 1		•
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2		•
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5		•
Solute carrier family 5, member 3	SLC5A3	Ť
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ACID transporter), member		•
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3	OLOUNG	1
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2	JEOURZ .	1
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4	OLOUAT	í

Solute carrier family 7(amino acid	SLC7A1	Т
transporter), member 1		
Solute carrier family 7(amino acid	SLC7A2	Т
transporter), member 2		
Solute carrier family 7(amino acid	SLC7A7	Т
transporter), member 7	01/00/	
Sphingomyelinase	SMPD1	E
Spinocerebellar ataxia 8 gene	SCA8	N
Steroid 5 alpha reductase 1	SRD5A1	E
Steroid 5 alpha reductase 2 Substance P	SRD5A2	E
		N
Succinic semi-aldehyde dehydrogenase Sulfamidase	ssadh	E
Sulfite oxidase	SGSH	G
Superoxide dismutase 1	SUOX	E
•	SOD1	Ε
Superoxide dismutase 3 Surfeit 1	SOD3 SURF1	E
Synapsin 1a & 1b	SYN1	G
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle amine transporter	SVAT	N
Synaptobrevin 1	SYB1	N
Synaptobrevin 2	SYB2	N N
Synaptogyrin	3162	N
Synaptophysin	SYP	N
Synaptotagmin 1	SYT1	N
Synaptotagmin 2	SYT2	N
Syntaxin 1	STX1	N
Talin	TLN	G
Tau protein	MAPT	Š
TEK, tyrosine kinase, endothelial	TEK	Ē
Telomerase protein component	, ,	E
Thrombin receptor	F2R	ī
Thrombopoietin	THPO	Ġ
Thromboxane A synthase 1	TBXAS1	Ī
Thromboxane A2	TXA2	i
Thromboxane A2 receptor	TBXA2R	ı
Thyroxin-binding globulin	TBG	Т
Topoisomerase I		Ε.
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Tuberous sclerosis 1	TSC1	G
Tuberous sclerosis 2	TSC2	G
Tumour necrosis factor (TNF) receptor	TRAF1	ı
associated factor 1		
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		
Tumour necrosis factor (TNF) receptor	TRAF3	I
associated factor 3	•	

Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	1
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	!
Tumour necrosis factor (TNF) receptor	TRAF6	1
associated factor 6		
Tumour necrosis factor alpha	TNFA	ı
Tumour necrosis factor alpha receptor	TNFAR	1
Tumour necrosis factor beta	TNFB	1
Tumour necrosis factor beta receptor	TNFBR	1
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tyrosine aminotransferase	TAT	Ε
Tyrosine hydroxylase	TH	Ε
Ubiquitin		G
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
Ubiquitin carboxyl-terminal esterase L1	UCHL1	G
UDP-glucuronosyltransferase 1	ugt1d, UGT1	Ε
UDP-glucuronosyltransferase 2	UGT2	Ε
Undulin 1	COL14A1	S
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	E
Uroporphyrinogen III synthase	UROS	. Е
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	N
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	N
Von Hippel-Lindau gene	VHL	G
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	G
Xanthine dehydrogenase	XDH	E
Zinc finger protein 2	ZIC2	S

In a sixth aspect.

DEMENTIA

The present invention relates to a method of assessing the risk of developing the degenerative processes and multiplicity of symptoms associated with dementia and dementing disorders.

Dementia and the associated non-cognitive symptomatology is a serious and growing problem. It affects 5% of people aged over 65 and 20% of those over 80. Changing demographics mean that the number of people affected by dementia is set to rise by 2-3% a year so that numbers of sufferers by the year 2020 will rise from 650,000 to 850,000 in the UK and from 3,000,000 to 5,000,000 in the USA.

Dementia is defined as a chronic generalised impairment of psychological functions. The characteristic feature of clinical impairment is a generalised cognitive impairment but there are significant changes in behaviour and mood the whole of which give a complex syndrome with considerable variation in the degree and type of symptomatology from patient to patient.

Dementia has been defined as a disease of the brain in which there is disturbance of intellectual functioning, usually of a chronic or progressive nature, with a compromising effect on at least three of the following:

- Memory
- Language
- Visual and spatial skills
- Emotion or personality
- Cognition.

The complex nature of the symptoms and their variability in different patients provide significant challenges for the effective clinical and psychological management of patients (Roberts et al 1993, Youdofsky and hales 1994, Gelder et al 1996, Lishman 1997) Youdofsky.

The causes of and molecular pathologies occuring in the processes leading to dementia are numerous – including such direct causes as Alzheimer's disease, prion disease, frontal lobe dementia, Lewy body disease, ischaemic brain injury, cerebrovascular disease, stroke, infection and head injury (Roberts et al 1993, Fig 1 a and b) or as adverse events following the use of drugs or surgical procedures (Walton, 1993, Roberts 1993, Gelsder et al 1996, Lishman, 1997, Brody. Larner and Minneman 1998).

Causes of dementia

Dementia has been related to many causes and conditions:

- Degenerative brain diseases
- Vascular disease
- Space-occupying lesions

- Trauma
- Infection
- Epilepsy
- Metabolic disease
- Endocrine dysfunction
- Autoimmune disease
- Toxicity
- Vitamin deficiency.

Recently significant advances have been made in the understanding of the molecular pathology underlying many of the dementing disorders. Neurotransmitter defecits have been described and the key proteins involved in the disorders have been identified (e.g. amyloid precursor protein, presenilin1 and 2, prion protein, tau protein and alpha-synuclein). Treatments designed to slow down the neuronal loss characteristic of dementia are becoming available. Furthermore, drug therapies that target the essential processes that result in dementia are in development and offer hope of a preventive therapeutic approach in the future.

All these advances are expected to complicate the process of clinical management in order to ensure that the most efficacious treatments are provided at the appropriate time to the individuals who will benefit most.

The clinical challenge is to identify patients with early signs of dementia and refer them promptly so that a more accurate diagnosis of the specific type of dementia can be made while the illness is still in its infancy. Other than in patients with a strong family background of disease, the diagnostic process is generally one of exclusion;

Alzheimer's disease

Alzheimer's disease (AD) is the most common form of dementia accounting for nearly 50% of cases. AD is defined as the development of multiple cognitive deficits manifest by both memory impairment and one or more of the following:

- language impairment
- · loss of visual and spatial skills
- impairment of recognition functions
- disturbance of executive functioning.

The cognitive deficits lead to significant impairment in social and occupational functioning and are represented by a significant decline from previous levels of functioning. The course of AD is characterized by gradual onset and continuing cognitive decline.

To confirm a diagnosis of AD, the following must be excluded:

- Other CNS conditions that can cause progressive deficit of memory and cognition (vascular disease, Parkinson's disease, Huntington's disease, subdural haematoma, normal pressure hydrocephalus, brain tumour, etc)
- Systemic conditions that are known to cause dementia (hypothyroidism, B₁₂ or folate deficiency, hypercalcaemia, neurosyphilis, HIV, etc)
- Substance or toxin -induced conditions.

In addition, the deficits must not occur exclusively during the course of a delirium and the disturbance must not be better accounted for by another psychiatric disorder.

Vascular dementia

Vascular dementia is the only major cause of dementia that is both treatable and preventable. Identification and prompt treatment are therefore especially important. Pure vascular disease accounts for at least 20% of dementias and plays a contributary role in a further 20%. Almost any cause of cerebrovascular disease may result in dementia if sufficient cortex is infarcted and/or cerebral blood flow is substantially reduced.

Diagnosis of vascular dementia is a three-stage process. First, the dementia syndrome has to be confirmed, and then the cerebrovascular disease diagnosed. Finally, the relationship between the two needs to be identified. Characteristics of vascular dementia include:

- Onset of dementia within three months of a stroke
- · History of abrupt cognitive decline
- Fluctuating mental changes, with forgetfulness, impaired concentration, emotional lability and slowness of thought
- Confused episodes.

There may also be:

- Small-stepped, wide-based gait (marche a petit pas)
- Pseudobulbar palsy
- Pyramidal signs
- Urinary incontinence
- Cogwheel rigidity
- Impaired eye movement.

One feature that helps to distinguish vascular dementia from AD is that blood pressure is usually raised in the former. However, falls in blood pressure are also associated with vascular dementia.

Once a diagnosis and prognosis has been made, the clinician must co-ordinate the appropriate care services, deliver treatment as necessary and ensure carers are well supported.

The process of determining a prognosis and thus a care plan for an individual patient is made difficult by the number of non-cognitive symptoms seen in dementing disorders.

Prognosis and management of the non-cognitive aspects of dementia

Non-cognitive symptoms are extremely common. Almost all patients experience at one or more of these symptoms during their illness. The difficulty lies in the very limited ability to prognose or predict which symptom is likely to be a problem in which patient. Without treatment, non-cognitive symptoms can increase patient suffering and the burden on carers. They can also lead to premature institutionalization and significant financial costs to the community. Because they are

treatable, it is imperative to recognise the non-cognitive symptoms of dementia and deliver prompt treatment.

Appropriate drug treatment can be efficacious but requires monitoring to avoid the possibility that it might worsen symptoms and induce side-effects (Gelder et al 1996, Lishman 1997, Brody, Larner and Minneman, 1998).

If symptoms are very troublesome a combination of drugs may be best. As the non-cognitive symptoms of dementia fluctuate throughout the course of the disease it is essential to assess patients regularly to ensure efficacious therapeutic interventions.

Non-cognitive symptoms in dementia and common therapeutic interventions

- Depression antidepressants (selective serotonergic reuptake inhibitors, tricyclic anti-depressants).
- Psychosis antipsychotics
- Affective changes antidepressants.
- Agitation antipsychotics, benzodiazepines, antidepressants, beta-blockers
- Wandering behavioural therapy or assess safety risk (often low in residential homes) and allow wandering
- Stereotypies antipsychotics
- Aggression antipsychotics, sulpiride and selective serotonin reuptake inhibitors, cholinergic agonists.
- Sleep disturbance tranquillisers, behavioural therapy.
- Incontinence identify the cause and treat it.
- Behavioural disturbance behavioural therapy, benperidol.

Caring for patients

The aim of therapeutic interventions in patients with dementia generally is to keep them in the community for as long as possible with as good a quality of life as possible. This will involve generating an accurate prognosis for the individual patient and coordinating clinical management, therapeutic interventions and monitoring with social support services for both patient and carer.

This ideal is rarely met in practice because of the difficulties involved in generating an accurate clinical prognosis. This failure is due to the complex pathological processes involved in degeneration taking place in the brain and the multi-dimensional nature of the cognitive and non-cognitive symptoms which occur in patients with dementia.

The individual variability in disease progression, symptomatology, response to therapy and adverse events resulting from therapeutic intervention lies at the heart of the difficulties experienced in the clinical management of dementia.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE

- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

DEMENTIA GENE LIST	HUGO gene symbol	Protein function
2,3-bisphosphoglycerate mutase	BPGM	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	Ē
5,10-methylenetetrahydrofolate reductase	MTHFR	Ē
(NADPH)		
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Adducin, alpha	ADD1	S
Adducin, beta	ADD2	S
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	· N
Adenylate cyclase 1	ADCY1	E
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	E
Adenylate cyclase 4	ADCY4	Ε
Adenylate cyclase 5	ADCY5	E
Adenylate cyclase 6	ADCY6	Ë
Adenylate cyclase 7	ADCY7	E .
Adenylate cyclase 8	ADCY8	E
Adenylate cyclase 9	ADCY9	E
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N
Adrenocorticotrophic hormone (ACTH)	ACTHR	G
receptor		
Albumin, ALB	ALB	Т

Aldosterone receptor	MLR	G
Alpha 2 macroglobulin	A2M	1
alpha1-antitrypsin	PI	Ε
alpha2-antiplasmin	PLI	E
alpha-synuclein	SNCA	N
Aminopeptidase P	XPNPEP2	E
Amyloid beta (A4) precursor protein-binding,	APBB1	N
APBB1 ·		
Amyloid beta A4 precursor protein	APP	N
Amyloid beta A4 precursor-like protein	APLP	N
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	E
Angiotensin receptor 1	AGTR1	Т
Angiotensin receptor 2	AGTR2	T
Angiotensinogen	AGT	E
Antidiuretic hormone receptor	ADHR	Т
Antithrombin III	AT3	E
Apolipoprotein A I	APOA1	Т
Apolipoprotein A II	APOA2	T
Apolipoprotein B	APOB	T
Apolipoprotein C1	APOC1	Т
Apolipoprotein C2	APOC2	Т
Apolipoprotein C3	APOC3	Т
Apolipoprotein D	APOD	Т
Apolipoprotein E	APOE	T
Apolipoprotein H	APOH	T
Apoptosis antigen 1	APT1	1
Arginase	ARG1	E
Arginine vasopressin	AVP	N
Arginine vasopressin receptor 1A	AVPR1A	N
Arginine vasopressin receptor 1B	AVPR1B	N
Arginine vasopressin receptor 2	AVPR2	N
Arginosuccinate lyase	ASL	Е
Arginosuccinate synthetase	ASS	Ε
Ataxia telangiectasia gene, AT	ATM	G
ATP/ADP translocase		E
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	. G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	G
beta-synuclein	SNCB	N
Bleomycin hydrolase	BLMH	Ε
Bradykinin receptor B1		1
Bradykinin receptor B2		1
Brain derived neurotrophic factor	BDNF	G
Brain derived neurotrophic factor (BDNF)	BDNFR	G

receptor	,	•
Butyrylcholinesterase	BCHE	E
Cadherin E	CDH1	G
Cadherin EP		G
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	i
Calcineurin A2	CALNA2	1
Calcineurin A3	CALNA3	ı
Calcineurin B		ı
Calcitonin/Calcitonin gene-related peptide	CALCA	N
alpha	· · · · · · · · · · · · · · · · · · ·	
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	Ν
subunit		
Calcium channel, voltage-dependent, Alpha-	CACNA1B	Ν
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	N
1C		
Calcium channel, voltage-dependent, Alpha-	CACNA1D	Ν
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	Ν
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	Ν
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3	CACNB3	Ν
Calcium channel, voltage-dependent, L type,	CACNA1S	Ν
alpha 1S subunit	•	
Calcium channel, voltage-dependent,	CACNG2	Ν
Neuronal, Gamma		
Calcium channel, voltage-dependent, P/Q	CACNA1A	Ν
type, alpha 1A subunit		•
Calcium channel, voltage-dependent, T-type		Ν
Calmodulin 1	CALM1	Ġ
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	۰G
Calmodulin-dependant protein kinase II	CAMK2A	G
Calnexin	CANX	G
Calpain	CAPN, CAPN3	E
Calretinin	CALB2	Ν
Carbonic anhydrase 3	CA3	Ε
Carbonic annydrase 4	CA4	E
Carbonic annydrase, alpha	CA1	E
Carbonic annydrase, aipha	CA2	E
Cardiac-specific homeobox, CSX	CSX	Ğ
Caspase 1	CASP1	Ğ
Caspase 1	J. 1.0	~

Caspase 10	CASP10	G
Caspase 2	CASP2	G
Caspase 3	CASP3	G
Caspase 4	CASP4	G
Caspase 5	CASP5	G
Caspase 6	CASP6	G
Caspase 7	CASP7	
Caspase 8	CASP8	G
Caspase 9	CASP9	G
Catechol-O-methyltransferase	COMT	G
CD1	CD1	E
CD4		ı
•	CD4	1
Cell adhesion molecule, intercellular, ICAM	ICAM1	G
Cell adhesion molecule, leukocyte-endothelial,	LECAM1	G
LECAM (CD62)		
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	PECAM1	G
PECAM	· .	
Cell adhesion molecule, vascular, VCAM	VCAM1	G
Chemokine receptor CXCR4	CXCR4	1
Choline acetyltransferase	CHAT	Ε
Chymotrypsinogen		Ε
Cockayne syndrome gene, CKN1	CKN1	G
Cofilin		S
Collagen I alpha 1	COL1A1	S
Collagen I alpha 2	COL1A2	S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S
Collagen IV alpha 2	COL4A2	S S
Collagen IV alpha 3	COL4A3	Š
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	Š
Collagen IV alpha 6	COL4A6	S S
Collagen IX alpha 2	COL9A2, EDM2	Š
Collagen IX alpha 3	COL9A3	S
Collagen receptor	COLR	S
Collagen V alpha 1	COL5A1	S
Collagen V alpha 2	COL5A2	S
Collagen VI alpha 1	COL6A1	9
Collagen VI alpha 2	COL6A2	9
Collagen VI alpha 3	COL6A3	S
Collagen VII alpha 1	COL7A1	S
Collagen X alpha 1	COL10A1	S S S S S S S S S
Collagen X alpha 1		S
Solidgon A dipina 1	COL11A1	5

Collagen XI alpha 2 Collagen XVII alpha 1 Corticotrophin-releasing hormone Corticotrophin-releasing hormone receptor Cu2+ transporting ATPase beta polypeptide Cyclic AMP-dependent protein kinase Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4C Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclooxygenase 1	COL11A2 COL17A1 CRH CRHR1 ATP7B PKA PDE2A3 PDE3A PDE3B PDE4A PDE4C PDE5A PDE6A PDE6B PDE7 PDE8 PDE9A COX1	
Cyclooxygenase 2 CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19	COX2 CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1	
CYP1A2 CYP1B1 CYP21 CYP24 CYP27 CYP27B1 CYP2A1 CYP2A13	CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1	
CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C19 CYP2C8	CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C19 CYP2C8	
CYP2C9 CYP2D6 CYP2E1 CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5	CYP2D6 CYP2E1 CYP2F1 CYP2J2 CYP3A3	

CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP51 CYP5A1 CYP5A1 CYP7A CYP8 Cystathione beta synthase Cystatin C Cystinosin Cytidine-5-prime-triphosphate synthetase Cytochrome a Cytochrome b-245 alpha	CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP51 CYP5A1 CYP7A CYP8 CBS CST3 CTNS CTPS	
Cytochrome b-245 beta	CYBB	E E
Cytochrome c	CIBB	. E
Cytochrome c oxidase, MTCO Dihydrolipoyl succinyltransferase Dopamine beta hydroxylase Dopamine receptors D1 Dopamine receptors D2 Dopamine receptors D3 Dopamine receptors D4 Dopamine receptors D5 Doublecortin, DCX Emerin Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Enolase Epidermal growth factor Epidermal growth factor receptor Epilepsy, progressive myoclonic 2 gene Excision repair complementation group 4 protein	DLST DBH DRD1 DRD2 DRD3 DRD4 DRD5 DCX EMD EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB ENO1 EGF EGFR EPM2A ERCC4	ШШШШZZZZZXX
Factor 1 (No. one) Factor III Factor IX Factor V Factor VII Factor VIII Factor X Factor XI Factor XII	F1 F3 F9 F5 F7 F8 F10 F11	

Canton VIII A G D	E42A 8 E40D	
Factor XIII A & B	F13A & F13B	<u> </u>
Fanconi anemia, complementation group A	FANCA	T
Fibrinogen alpha	FGA	S
Fibrinogen beta	FGB	S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
GABA receptor, alpha 1	GABRA1	Ν
GABA receptor, alpha 2	GABRA2	Ν
GABA receptor, alpha 3	GABRA3	N
GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	N
GABA receptor, beta 1	GABRB1	N
GABA receptor, beta 2	GABRB2	N
GABA receptor, beta 3	GABRB3	N
GABA receptor, gamma 1	GABRG1	N
GABA receptor, gamma 2	GABRG2	N
GABA receptor, gamma 3	GABRG3	N
GABA transaminase	ABAT	E
Galactosyltransferase 1	GT1	G
Galactosyltransferase, alpha 1,3	GGTA1	G
Galactosyltransferase, beta 3	B3GALT	G
Gastric Intrinsic factor, GIF	GIF	E
	GIF	N
Glial-cell derived neurotrophic factor (GDNF)		IV
receptor	ODNE	
Glial-cell derived neurotrophic factor, GDNF	GDNF	N
Glutamate decarboxylase, GAD	GAD1	E
Glutamate receptor 1	GLUR1	N
Glutamate receptor 2	GLUR2	N
Glutamate receptor 3	GLUR3	N
Glutamate receptor 4	GLUR4	N
Glutamate receptor 5	GLUR5	N
Glutamate receptor 6	GLUR6	N
Glutamate receptor 7	GLUR7	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	Ν
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	Ν
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	Ν
Glutaryl-CoA dehydrogenase	GCDH	Ε
Glutathione	GSH	Τ
Glutathione S-transferase, GSTZ1	GSTZ1	Ε

Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	E
Glycerol kinase	GK	Ε
Glycinamide ribonucleotide (GAR)	GART	Ε
transformylase		
	GNRHR	G
Guanylyl cyclase		E
	HBA1	T
Talaka Salah	HBA2	T
	HBB	T
	HBD	T
	HBG1	Т
	HBG2	Т
Haemoglobin gamma G	HBGG	Т
Heparan sulfamidase		Е
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	Ī
Hepatic lipase	LIPC	Ē
Hexosaminidase A	HEXA,TSD	Ē
·· · · · · · —	HEXB	E
Hippocampal cholinergic neurostimulating peptic	de, HCNP	N
Histamine receptors, H1	·	N
Histamine receptors, H2		N
Histamine receptors, H3		N
Histidase		E
HLA-B associated transcript 1	BAT1	ī
110.00	HMGCR	Ė
	HLCS	Ē
'		E
Hypoxia inducible factor 2		Ē
IC7 A and B		ī
Inositol monophosphatase	IMPA1	N
		G
		G
	· 	Ğ
		G
		G
		G
		G
~		G
		G
	TGA1	G
	ITGA2	G
	ITGA3	G
		G
		G
		G
• · · · · · · · · · · · · · · · · · · ·		G G
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Integrin, alpha 8	ITGA8	G
Integrin, alpha 9	ITGA9	G
Integrin, alpha M	ITGAM	G
Integrin, alpha X	ITGAX	G
Interleukin(IL) 1 receptor	IL1R	1
Interleukin(IL) 1, alpha	IL1A	1
Interleukin(IL) 1, beta	IL1B	i
Interleukin(IL) 10	IL10	i
Interleukin(IL) 10 receptor	IL10R	i
Interleukin(IL) 11	IL11	i
Interleukin(IL) 11 receptor	IL11R	i
Interleukin(IL) 12	IL12	ʻ iʻ
Interleukin(IL) 12 receptor, beta 1	IL12RB1	i
Interleukin(IL) 13	IL13	Í
Interleukin(IL) 13 receptor	IL13R	i
Interleukin(IL) 2	IL2	i
Interleukin(IL) 2 receptor, alpha	IL2RA	i
Interleukin(IL) 2 receptor, gamma	IL2RG	i
Interleukin(IL) 3	IL3	i
Interleukin(IL) 3 receptor	IL3R	i
Interleukin(IL) 4	IL4	i
Interleukin(IL) 4 receptor	IL4R	i
Interleukin(IL) 5	IL5	i
Interleukin(IL) 5 receptor	IL5R	i
Interleukin(IL) 6	IL6	ì
Interleukin(IL) 6 receptor	IL6R	1
Interleukin(IL) 7	IL7	1
Interleukin(IL) 7 receptor	IL7R	1
Interleukin(IL) 8	IL8	1
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	ĺ
IP3 kinase		Ē
Kallikrein 3	KAK3	i
Kininogen, High molecular weight	KNG	1
Kynureninease		E
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta binding	LTBP2	Ğ
protein 2		_
Leptin	LEP	G
Leptin receptor	LEPR	Ğ
Leukin		Ī
Leukocyte-specific transcript 1	LST-1	İ
· · · ·	· · · · ·	•

Leukotriene A4 hydrolase		ı
Leukotriene A4 synthase	LTA4S	Ε
Leukotriene B4 receptor		1
Leukotriene B4 synthase	LTB4S	Ε
Leukotriene C4 receptor		1
Leukotriene C4 synthase	LTC4S	Ε
Leukotriene D4/E4 receptor		1
LIM homeobox protein 1	LHX1	G
LIM-Kinase I (LINK-I)		ĺ
Lipoprotein receptor, Low Density	LDLR	Т
Lipoprotein, High Density	HDLDT1	Т
Lipoprotein, Intermediate Density		Т
Lipoprotein, Low Density 1		Т
Lipoprotein, Low Density 2		Т
Lipoprotein, Very Low Density	VLDLR	Ť
Low density lipoprotein receptor-related protein	LRP	Т
precursor		•
Lymphoid enhancer-binding factor	LEF-1	G
MAD (mothers against decapentaplegic,	MADH4	Ğ
Drosophila) homologue 4		_
Mannosidase, alpha B lysosomal	MANB	Ε
Mannosidase, beta A lysosomal	MANBA	E
Methionine synthase	MTR	E
Mismatch repair gene, PMSL2	PMS2	Ğ
Molybdenum cofactor synthesis 1	MOCS1	E
Molybdenum cofactor synthesis 2	MOCS2	E
Monoamine oxidase A	MAOA	Ε
Monoamine oxidase B	MAOB	Ε
Muscarinic receptor, M1	CHRM1	Ν
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	Ν
Muscarinic receptor, M5	CHRM5	Ν
Myelin basic protein		S
N-acetylglucosamine-6-sulfatase	GNS	E
N-acetylglucosaminidase, alpha	NAGLU	Ε
NADPH-dependent cytochrome P450	POR	Ε
reductase	7. ·	
NB6		1.
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neurite inhibitory protein		Ν
Neuroendocrine convertase 1	NEC1, PCSK1	Ε
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	Ğ
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68	NF68	S

Neurokinin A	NKNA	Ν
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Nitric oxide synthase 1, NOS1	NOS1	E
Nitric oxide synthase 2, NOS2	NOS2	Ē
Nitric oxide synthase 3, NOS3	NOS3	E
Notch 3	NOTCH3	G
Nuclear factor I-kappa-B-like gene	IKBL	ı
Nucleoside diphosphate kinase-A	NDPKA	-
Oncogene bcl2	NDI IVA	,E
Oncogene sis	PDGFB	G G
Ornithine delta-aminotransferase	OAT	
		E
Ornithine transcarbamoylase Parkin	OTC, NME1 PARK2	
	PARKZ	Ν
Persyn Phosphoglucose isomerase	GPI	S E
Phosphoglycerate kinase 1	PGK1	E
Phospholipase A2, group 10	PLA2G10	-
Phospholipase A2, group 1B	PLA2G1B	ı
Phospholipase A2, group 2A	PLA2G2A	l I
· · · · · · · · · · · · · · · · · · ·	PLA2G2B	
Phospholipase A2, group 2B	PLA2G4A	1
Phospholipase A2, group 4A		1
Phospholipase A2, group 4C	PLA2G4C	1
Phospholipase A2, group 5	PLA2G5	
Phospholipase A2, group 6	PLA2G6	
Phospholipase C alpha		
Phospholipase C beta	DI CD4	l
Phospholipase C delta	PLCD1	!
Phospholipase C epsilon	DI 004	1
Phospholipase C gamma	PLCG1	_
Plasminogen	PLG	E
Plasminogen activator inhibitor 1	PAI1	Ε
Plasminogen activator inhibitor 2	PAI2	E
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	E
Plasminogen activator, Urokinase		E
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Platelet-activating factor receptor	PAFR	1
Postsynaptic density-95 protein	PSD95	N
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium voltage-gated channel E1	KCNE1	N
Potassium voltage-gated channel Q1	KCNQ1	N
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)		
Prekallikrein		ĺ

Droppilin 4	DOENIA	_
Presentlin 1	PSEN1	T
Presentin 2	PSEN2	T
Prion protein	PRNP	Ν
Procollagen N-protease		Ε
Proopiomelanocortin	POMC	Ν
Prostacyclin synthase		ı
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	1
Prostaglandin D - DP receptor		I
Prostaglandin E1 receptor	•	- 1
Prostaglandin E2 receptor		1
Prostaglandin E3 receptor		-1
Prostaglandin F - FP receptor		-
Prostaglandin I2 receptor		Т
Prostaglandin IP receptor		1
Protective protein for beta-galactosidase	PPGB	E
Protein C	PROC	ı
Protein C inhibitor	PCI	1
Protein kinase C, alpha	PRKCA	Ε
Protein kinase C, gamma	PRKCG	Ε
Protein kinase G		Ε
Protein phosphatase 1, regulatory (inhibitor)	PPP1R3	Ε
subunit 3		
Protein S	PROS1	1
Prothrombin precursor	F2	i
Purine nucleoside phosphorylase	NP .	Ē
Pyruvate carboxylase	PC	E
Renin	REN	E
Replication factor C	RFC2	E
RIĠUI	RIGUI	Ğ
S100 calcium-binding protein A1	S100A1	Ň
S100 calcium-binding protein A2	S100A2	N
S100 calcium-binding protein A3	S100A3	N
S100 calcium-binding protein A4	S100A4	N
S100 calcium-binding protein A5	S100A5	N
S100 calcium-binding protein A6	S100A6	N
S100 calcium-binding protein A7	S100A7	N
S100 calcium-binding protein A8	S100A8	N
S100 calcium-binding protein A9	S100A9	N
S100 calcium-binding protein B	S100B	N
S100 calcium-binding protein P	S100P	N
Secretase, alpha	3.00.	N
Secretase, beta		N
Secretase, gamma		N
Selectin E	SELE	N
Selectin L	SELL	N
Selectin P.	SELP	
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A	HTR1A	
deletering recoptor, of 11 17	нихим .	N

Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma	SCNN1G	N
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide		•
Solute carrier family 1 (glutamate transporter),	SLC1A1	T
member 1		
Solute carrier family 1 (glutamate transporter),	SLC1A2	Т
member 2		
Solute carrier family 12, member 1	SLC12A1	T
Solute carrier family 12, member 2	SLC12A2	T
Solute carrier family 12, member 3	SLC12A3	Т
Solute carrier family 18, member 3	SLC18A3	Т
Solute carrier family 5 (sodium/glucose	SLC5A1	T
transporter), member 1		
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2		
Solute carrier family 5 (sodium/glucose	SLC5A5	T
transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member 1		
Solute carrier family 6 (neurotransmitter	SLC6A3	T
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	Τ
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		
Sphingomyelinase	SMPD1	Ε
Substance P		Ν
Succinic semi-aldehyde dehydrogenase	ssadh	Ε
Sulfite oxidase	SUOX	E
Superoxide dismutase 1	SOD1	E
Superoxide dismutase 3	SOD3	Ε
Surfeit 1	SURF1	G

Synaptogyrin		A.I
Synaptophysin	SYP	N
Syntaxin 1	STX1	N
Talin	TLN	N
Tau protein		G
•	MAPT	S
TEK, tyrosine kinase, endothelial	TEK	Ε
Telomerase protein component		. E
Thrombin receptor	F2R	- 1
Thrombopoietin	THPO	G
Thromboxane A synthase 1	TBXAS1	i
Topoisomerase I		Ε
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Tumour necrosis factor (TNF) receptor	TRAF1	.
associated factor 1		
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		•
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3		•
Tumour necrosis factor (TNF) receptor	TRAF4	ı
associated factor 4		•
Tumour necrosis factor (TNF) receptor	TRAF5	1
associated factor 5		•
Tumour necrosis factor (TNF) receptor	TRAF6	ı
associated factor 6		,
Tumour necrosis factor alpha	TNFA	1
Tumour necrosis factor alpha receptor	TNFAR	1
Tumour necrosis factor beta	TNFB	;
Tumour necrosis factor beta receptor	TNFBR	,
Tumour protein p53	TP53, P53	_
Tumour protein p63	TP63	G
Tyrosine aminotransferase	TAT	G
Tyrosine hydroxylase	TH	Ē
Ubiquitin	18	E
•	UDD	G
Ubiquitin B Ubiquitin C	UBB	G
•	UBC	G
Ubiquitin carboxyl-terminal esterase L1	UCHL1	G
UDP-glucuronosyltransferase 1	ugt1d, UGT1	··E
UDP-glucuronosyltransferase 2	UGT2	E
Uridinediphosphate(UDP)-galactose-4-	GALE	E
epimerase		
Uroporphyrinogen III synthase	UROS	Ε
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	Ν
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	Ν
Xanthine dehydrogenase	XDH	Ε

In a seventh aspect.

PSYCHOSES AND PERSONALITY

The invention relates to a method of assessing the risk of developing clinical or social consequences of psychotic disorders or disorders of personality and indicating appropriate therapeutic interventions.

The 1990's has been heralded as the 'decade of the brain' and the cumulative efforts of research groups around the world have led to considerable advances in our understanding of the principles, physiology and mechanisms of brain, or more properly, central nervous system (CNS) function.

The primary role of CNS function is to gather, integrate, and evaluate information concerning the organisms internal and external environments and then formulate actions designed to achieve the organisms' goals. In man such a simplistic summary lies behind our understanding of the physiology of the simple reflex ark and our crude attempts at investigating the information processing/physiology interface which enables the higher cognitive functions (e.g. reading writing, mathematics, music etc.).

The CNS often referred to as a single organ in the body. In reality it is a closely interconnected series of specialised sub-organs (e.g. hypothalamus, cortex, cerebellum, thalamus etc) which are known to have discrete functions. Understanding brain function implies a clear understanding of the biochemical, physiological and informational parameters which enable the interconnections between these sub-organs and which control the nature, direction and volume of information flow between them.

The CNS is made up of two major types of cells – neurones and glia. Neurones have a variety of morphological types (Betz cell, pyramidal cell etc) but each type has a common set of morphological features – cell body, dendrites, axon and axon terminals. Axons can be very long (up to 1 metre for spinal tracts) and project to distant regions of the CNS. Bundles of axons form the white matter tracts within the CNS. In terms of the processes of communication dendrites and axons are critical features as incoming information is usually received on dendrites whereas axons are the channels for information outflow. Communication between neurones is achieved by means of the release of neurotransmitters (a label which includes many types of molecules e.g. peptides, amines and nitric oxide) from specialised sites on axons - synapses. Thus, the release of neurotransmitters and their movement across the synaptic gap and interaction with receptor sites on neighbouring neurones is the core functional mechanism in the CNS.

Glial cells outnumber neurones and are divided into astrocytes, oligodendrocytes and microglia. Glia had been considered as having a 'support' role for neuronal functioning. It is now realised that their functions' extend far beyond this and that they may be actively involved in the information processing function and in the modulation of the neuronal environment. Microglia have a critical role in the response of the CNS to disease, infection and damage. Such events 'activate' microglia causing

them to release a variety of factors (e.g. cytokines, growth factors) which aid the recovery and regeneration of CNS functions.

The point to point contact between specific sets of neurones is critical for CNS function. Failure of this point to point contact either through dysfunction, damage or disease lies at the heart of the appearance of neurological, psychiatric, psychological or social difficulties following such events (Roberts, Leigh and Weinberger 1993, Youdofsky and Hales 1994, Gelder 1996, Weatherall, Leadingham and Warrell 1996) Lishman 1997).

PSYCHOSES AND DISORDERS OF PERSONALITY

A number of disorders present as subtle or marked changes from socially accepted norms in the way that ideas, thoughts or mood states are experienced or acted upon. In many cases although the presence of such phenomena can be readily documented at clinical interview, the certain identification of a CNS lesion or biochemical abnormality is not possible.

Examples of psychoses and personality disorders include;
Schizophrenia
Depression
Anxiety states
Mania
Delirium
Paranoia
Personality disorders
Sleep disorders
Psychopathic disorders
Sociopathic disorders
Gender disorders
Substance abuse disorders

Psychoses are disorders of higher cognitive functions characterised by disturbances of reality or perception, impaired cognitive function, psychomotor retardation, thought disorder, affective disorder and depressive or manic symptoms (Gelder et al 1996, Lishman 1997). Schizophrenia is the disease most commonly associated with chronic psychotic states but similar states can be found in individuals with dementia or who have engaged in substance abuse. Delusions, hallucinations, thought disorder and flattening of affect are prominent symptoms in schizophrenia (Gelder et al 1997).

Mood disorders (e.g. depression, anxiety, mania) are also forms of psychotic disorders. As the name suggests the primary symptomatology seen in individuals with these types of psychosis are profound changes in mood (e.g. euphoria, elation, agitation rumination, depression) which is sustained and inappropriate given the individuals circumstances (Roberts, Leigh and Weinberger 1993, Gelder et al 1996, Lishman 1997).

Personality refers to the general way in which a given individual behaves and responds to a wide variety of social and environmental circumstances. The assessment

of personality in relation to illness or injury is of importance as this can determine how a given individual might respond or behave when experiencing the stress of ill health or altered circumstances. Personality disorders are identified when an individual has always behaved in an abnormal fashion (although the definition of such abnormal behaviour is difficult, Gelder et al 1996). In such individuals the difficulties of healthcare management are compounded due to the pre-existing abnormal pattern of behaviour. The types of behavioural traits encountered in personality disorders include paranoia, aloofness, obsession, aggression, dependancy, mistrustfulness, psychopathic, anti-social, passive, impulsive, stubborn, guilt and lack of guilt (Gelder et al 1996).

The range and degree of symptoms present is very variable and the exact boundary between psychotic or personality disorders and 'eccentric' everyday behaviour can be difficult to distinguish. As such there is a considerable interaction between the individuals social environment and the degree or otherwise to which 'abnormal' behaviours or thoughts will be accepted or tolerated.

Some acute psychotic states (often related to substance abuse) resolve fairly rapidly and may leave little or nothing in the way of residual problems. However, the majority of psychotic and personality disorders can give rise to profoundly disabling conditions in which individuals experience significant clinical, psychological, social and economic consequences of their disorders.

Given these difficulties, the management of the healthcare of such patients can include drug treatments, psychotherapy, behavioural modification, psychological counselling, occupational therapies, community care and even psychosurgery.

In many of these disorders drug therapy intended to modify the actions of particular neurotransmitters can be very effective (e.g. neuroleptics, lithium, benzodiazepines). However, many of these drugs also have side-effects such as sedation, orthostatic hypertension, sexual dysfunction, reflex tachycardia and impaired cognition. As a result of the side effects and the disordered mental state of many patients compliance in drug therapy is a significant issue in healthcare management. Such problems can be greatly magnified when dealing with patients with a personality disorder.

The physiology and control of the body's central nervous system is extremely complex and involves the synergistic or inhibitory interaction between multiple regulatory pathways and molecular cascades. Variation in the functionality of the proteins involved in these processes will, inevitably, cause or have an impact on the functioning of these systems or an individuals attempts to minimise damage and restore function following dysfunction, damage or disease in these systems. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from psychotic disorders and disorders of personality including genetic history, age, sex, nutritional status, pre-existing disease or injury, drug treatments and socio-economic circumstances. Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to the occurrence of psychotic and personality disorders and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at the heart of the difficulties experienced in the healthcare and social management of psychotic disorders and disorders of personality.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

PSYCHOSES & PERSONALITY GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	E
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	E
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	Ν
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N.
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
	CHRNE	a source of N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Adenosine receptor A1	ADORA1	Ν
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	· N
Adenylate cyclase 1	ADCY1	. Е
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	Ε
Adenylate cyclase 4	ADCY4	E

Adenylate cyclase 5 Adenylate cyclase 6 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 9 Adenylosuccinate lyase Adrenergic receptor, alpha1 Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH)	ADCY5 ADCY6 ADCY7 ADCY8 ADCY9 ADSL ADRA1 ADRA2 ADRB1 ADRB2 ADRB3 ACTHR	ШШШШШХХХХО
receptor Albumin, ALB alpha1-antichymotrypsin alpha-synuclein Amyloid beta A4 precursor protein Amyloid beta A4 precursor-like protein Apolipoprotein A II Apolipoprotein B Apolipoprotein C1 Apolipoprotein C2 Apolipoprotein C3 Apolipoprotein D Apolipoprotein H Arginosuccinate synthetase Arylsulfatase A Ataxia telangiectasia gene, AT ATP/ADP translocase Atrial natriuretic peptide	ALB AACT SNCA APP APLP APOA1 APOA2 APOB APOC1 APOC2 APOC3 APOD APOE APOH ASS ARSA ATM	TENNNTTTTTTTTEEGEG
Atrial natriuretic peptide Atrial natriuretic peptide receptor A Atrial natriuretic peptide receptor B Atrial natriuretic peptide receptor C Bagpipe homeobox, drosophila homolog of, 1 beta-synuclein Brain derived neurotrophic factor Brain derived neurotrophic factor (BDNF) receptor C1 inhibitor Ca(2+) transporting ATPase, slow twitch Calbindin 1	NPR1 NPR2 NPR3 BAPX1 SNCB BDNF BDNFR	GGGGRGG ET
Calbindin 1 Calbindin D9K Calcineurin A1 Calcineurin A2 Calcineurin A3 Calcineurin B	CALB1 CALB3 CALNA1 CALNA2 CALNA3	G G

Calcitonin/Calcitonin gene-related peptide	CALCA	Ν
alpha		
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	Ν
subunit		
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C		
Calcium channel, voltage-dependent, Alpha-	CACNA1D	Ν
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N·
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	N
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3	CACNB3	Ņ
Calcium channel, voltage-dependent,	CACNG2	N
Neuronal, Gamma		
Calcium channel, voltage-dependent, T-type		Ν
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	Ğ
Calmodulin 3	CALM3	Ğ
Calmodulin-dependant protein kinase II		Ğ
Calnexin		G
Calpain	CAPN, CAPN3	Ē
Calretinin		N
Cannabinoid receptor		N
Carbonic anhydrase 3		E
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	Ē
Carbonic anhydrase, beta		E
Cardiac-specific homeobox, CSX		G
Caspase 1		Ğ
Catechol-O-methyltransferase		E
Ceroid lipofuscinosis neuronal 2		N
Ceroid lipofuscinosis neuronal 3		N
Ceroid lipofuscinosis neuronal 4		N
Ceroid lipofuscinosis neuronal 5		N
Ceroid lipofuscinosis neuronal 6	CLN6	N
Chemokine receptor CCR5	CCR5	1
Chemokine receptor CXCR4	CXCR4	i
Cholecystokinin	CCK	N
Cholecystokinin B receptor		N
Choline acetyltransferase	CHAT	E
Chymotrypsinogen	J. // 11	E
Ciliary neurotrophic factor (CNTF)	CNTF	G
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	G
Citrate synthase		E
and a grinia o		_

Cyclic AMP response element binding protein Cyclic AMP-dependent protein kinase Cyclic nucleotide phosphodiesterase 1B Cyclic nucleotide phosphodiesterase 1B1 Cyclic nucleotide phosphodiesterase 1B1 Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cycloxygenase 1 Cycloxygenase 1 Cycloxygenase 1 Cycloxygenase 2 CYP11A1 CYP11B1 CYP11B1 CYP11B2 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1A1 CYP1A1 CYP1A2 CYP1A1 CYP1A2 CYP1A1 CYP1A2 CYP1A1 CYP1A1 CYP1A2 CYP1A1 CYP1A1 CYP1A1 CYP1A2 CYP1A1 CYP1A1 CYP1A2 CYP1A1 CYP1A2 CYP1A1 CYP2A1 CYP2A1 CYP2A1 CYP2A1 CYP2A1 CYP2A1 CYP2A1 CYP2A1 CYP2A1 CYP2A1 CYP2A1 CYP2A3 CYP2A3 CYP2A3 CYP2A6V2 CYP2A6V2 CYP2A6V2 CYP2A6V2 CYP2A6 CYP2C9 C	
CYP2J2 CYP2J2	Ē

CYP3A3		CYP3A3		Ε
CYP3A4		CYP3A4		E
CYP3A5		CYP3A5		Ē
CYP3A7		CYP3A7		E
CYP4A11		CYP4A11		
CYP4B1		CYP4B1		E E
CYP4F2		CYP4F2		
CYP4F3		CYP4F3		Ē
CYP51		CYP51		
CYP5A1		CYP5A1		E
CYP7A		CYP7A		E
CYP8		CYP8		
Cystathionase		CTF		E
Cystathione beta synthase		CBS		E
Cytidine deaminase		CDA		E
Cytidine-5-prime-triphosphate synthetase		CTPS		E
Cytochrome a		CIPS		E
Cytochrome c				E
Cytochrome c oxidase, MTCO				E
Delta aminolevulinate dehydratase		ALAD		E
Delta-7-dehydrocholesterol reductase		ALAD DHCR7	•	E
Dihydrolipoamide succinyltransferase		DHCKI		E
Dopamine beta hydroxylase		2011		N
· · · · · · · · · · · · · · · · · · ·		DBH		E
Dopamine receptors D1		DRD1		N
Dopamine receptors D2		DRD2		N
Dopamine receptors D3		DRD3		N
Dopamine receptors D4.		DRD4		N
Dopamine receptors D5 Endothelin 1		DRD5		N
Endothelin 2		EDN1		N
Endothelin 3		EDN2		N
		EDN3		N
Endothelin converting enzyme		ECE1		N
Endothelin receptor type A		EDNRA		N
Endothelin receptor type B	•	EDNRB		N
Enolase		ENO1		E
Epidermal growth factor		EGF		G
Epidermal growth factor receptor		EGFR		G
 Excision repair complementation group 4	** .**	ERCC4	fred give to object	Έ.
protein				•
Fibroblast growth factor		FGF1		G
Fibroblast growth factor receptor 1		FGFR1		G
Fibroblast growth factor receptor 2		FGFR2		G
Fibroblast growth factor receptor 3		FGFR3		G
Flightless-II, Drosophila homolog of		FLII		G
Fragile site, folic acid type, rare, fra(X) A		FRAXA		N
Fragile site, folic acid type, rare, fra(X) E		FRAXE		N
Fragile site, folic acid type, rare, fra(X) F		FRAXF		Ν
GABA receptor, alpha 1		GABRA1		Ν
•				

GABA receptor, alpha 2 GABA receptor, alpha 3 GABA receptor, alpha 4 GABA receptor, alpha 5 GABA receptor, alpha 6 GABA receptor, beta 1	GABRA2 GABRA3 GABRA4 GABRA5 GABRA6 GABRB1	22222
GABA receptor, beta 2 GABA receptor, beta 3 GABA receptor, gamma 1 GABA receptor, gamma 2 GABA receptor, gamma 3 GABA transaminase GDP dissociation inhibitor 1 Geniospasm 1 Glial-cell derived neurotrophic factor (GDNF)	GABRB2 GABRB3 GABRG1 GABRG2 GABRG3 ABAT GDI1 GSM1	N N N N E G G
receptor Glial-cell derived neurotrophic factor, GDNF Glutamate decarboxylase, GAD Glutamate receptor 1 Glutamate receptor 2 Glutamate receptor 3 Glutamate receptor 4 Glutamate receptor 5 Glutamate receptor 6 Glutamate receptor 7 Glutamate receptor, ionotropic, NMDA 1 Glutamate receptor, ionotropic, NMDA 2A Glutamate receptor, ionotropic, NMDA 2B Glutamate receptor, ionotropic, NMDA 2C Glutamate receptor, ionotropic, NMDA 2C Glutamate receptor, ionotropic, NMDA 2D	GDNF GAD1 GLUR1 GLUR2 GLUR3 GLUR4 GLUR5 GLUR6 GLUR7 NMDAR1 NMDAR2A NMDAR2A NMDAR2B NMDAR2C NMDAR2D GCDH GSH GSTZ1 GAPDH	Z ZEZZZZZZZZZEH E
GAPDH Glycerol kinase Glycinamide ribonucleotide (GAR)	GK GART	E E
transformylase Gonadotropin releasing hormone receptor Guanidinoacetate N-methyltransferase Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNRHR GAMT GNAO1	G E N
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAI1 Guanine nucleotide-binding protein, alpha	GNAI1	N N
inhibiting activity polypeptide 2, GNAI2 Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNAI3	GNAI3	N

Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	N
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	Ν
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	Ν
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	N
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNAT1	N
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	Ν
Guanine nucleotide-binding protein, beta polypeptide 3 Guanine nucleotide-binding protein, q	GNB3 GNAQ	N
polypeptide Guanylate cyclase 2D, membrane (retina-	GUCY2D	N E
specific) Guanylate cyclase activator 1A (retina)	GUCA1A	E
Guanylyl cyclase Heat shock protein, HSP60		E
Heat shock protein, HSP70 Heat shock protein, HSP90		1
Heat shock protein, HSPA1 Heat shock protein, HSPA2		
Heparan sulfamidase Hepatic lipase	LIPC	E
Histamine receptors, H1 Histamine receptors, H2		N N
Histamine receptors, H3		N
HMG-CoA reductase	HMGCR	E
Huntingtin	HD	T
Hypoxanthine-guanine	HPRT	Ε
phosphoribosyltransferase, HGPRT		
Hypoxia inducible factor 1	HIF1A	Ε
Hypoxia inducible factor 2		Ε
Inositol monophosphatase	IMPA1	Ν
Insuling	INS COMMON COMPROS COMMON COMPROS COMMON COMPROS	G
Insulin receptor	INSR	G
Interleukin(IL) 1 receptor	IL1R	l
Interleukin(IL) 1, alpha	IL1A	!
Interleukin(IL) 1, beta	IL1B	!
Interleukin(IL) 10	IL10	l i
Interleukin(IL) 10 receptor Interleukin(IL) 11	IL10R IL11	į į
Interleukin(IL) 11 receptor	IL11R	i i
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	i

Interleukin(IL) 13	IL13	1
Interleukin(IL) 13 receptor	IL13R	1
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	1
Interleukin(IL) 2 receptor, gamma	IL2RG	
Interleukin(IL) 3	IL3	Ĺ
Interleukin(IL) 3 receptor	IL3R	i
Interleukin(IL) 4	IL4	i
Interleukin(IL) 4 receptor	IL4R	i
Interleukin(IL) 5	IL5	İ
Interleukin(IL) 5 receptor	IL5R	i
Interleukin(IL) 6	IL6	i
Interleukin(IL) 6 receptor	IL6R	i
Interleukin(IL) 7	IL7	i
Interleukin(IL) 7 receptor	IL7R	i
Interleukin(IL) 8	IL8	i
Interleukin(IL) 8 receptor	·IL8R	i
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	î
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	1
IP3 kinase	·	· E
Leukin		Ī
Mismatch repair gene, PMSL2	PMS2	G
Monoamine oxidase A	MAOA	Ε
Monoamine oxidase B	MAOB	Ε
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Myelin basic protein		S
Myosin, light chain 3	MYL3	S
NADPH-dependent cytochrome P450	POR	Ε
reductase	,	
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neurite inhibitory protein		N
Neurofibromin 1	NF1	· G
Neurofibromin 2	NF2	G
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68	NF68	S
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Neurotensin	NTS	N

Neurotensin receptor	NTSR1	N
Nitric oxide synthase 1, NOS1	NOS1	E
Nitric oxide synthase 2, NOS2	NOS2	Ē
Nitric oxide synthase 3, NOS3	NOS3	E
Nucleoside diphosphate kinase-A	NDPKA	E
Oncogene sis	PDGFB	G
Opioid receptor, delta	OPRD1	
Opioid receptor, kappa	OPRK1	N
Opioid receptor, mu	OPRM1	N
Ornithine delta-aminotransferase	OAT	N
Paraoxonase PON1	PON1	E
Parkin		E
	PARK2	Ņ
Phospholipase A2, group 10	PLA2G10	1
Phospholipase A2, group 1B	PLA2G1B	Ţ
Phospholipase A2, group 2A	PLA2G2A	I
Phospholipase A2, group 2B	PLA2G2B	ı
Phospholipase A2, group 4A	PLA2G4A	!
Phospholipase A2, group 4C	PLA2G4C	ļ
Phospholipase A2, group 5	PLA2G5	- 1
Phospholipase A2, group 6	PLA2G6	1
Phospholipase C alpha		1
Phospholipase C beta		ł
Phospholipase C delta	PLCD1	1
Phospholipase C epsilon		1
Phospholipase C gamma	PLCG1	1
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Potassium inwardly-rectifying channel J1	KCNJ1	Ν
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)	•	
Presenilin 1	PSEN1	T
Presenilin 2	PSEN2	Т
Prion protein	PRNP	Ν
Proline dehydrogenase	PRODH	Ε
Proopiomelanocortin	POMC	N
Prosaposin	PSAP	N
Protective protein for beta-galactosidase	PPGB	E
Protein kinase C, alpha	PRKCA	Ē
Protein kinase C, gamma	PRKCG	. E
Protein kinase G	,	Ē
Protein phosphatase 1, regulatory (inhibitor)	PPP1R3	Ē
subunit 3		~
Proteolipid protein	PLP	N
RIGUI	RIGUI	Ğ
S100 calcium-binding protein A1	S100A1	N
S100 calcium-binding protein A2	S100A1	N
S100 calcium-binding protein A3	S100A2 S100A3	N
S100 calcium-binding protein A4	\$100A3 \$100A4	N N
	♥ 100/ 1	I.A

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S100 calcium-binding protein A5	S100A5	Ν
S100 calcium-binding protein A6	S100A6	N
\$100 calcium-binding protein A7	S100A7	N
S100 calcium-binding protein A8	S100A8	N
S100 calcium-binding protein A9	S100A9	N
S100 calcium-binding protein B	\$100B	N
S100 calcium-binding protein P	S100P	N
Secretase, alpha	3.001	N
Secretase, beta		N
Secretase, gamma		N
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma	SCNN1G	N
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide		
Solute carrier family 12, member 1	SLC12A1	T
Solute carrier family 12, member 2	SLC12A2	Т
Solute carrier family 12, member 3	SLC12A3	Т
Solute carrier family 4 (anion exchanger),	SLC4A1	Т
member 1		
Solute carrier family 4 (anion exchanger),	SLC4A2	Т
member 2		
Solute carrier family 4 (anion exchanger),	SLC4A3	Τ
member 3		
Solute carrier family 5 (sodium/glucose	SLC5A1	T
transporter), member 1		
Solute carrier family 5 (sodium/glucose	SLC5A2	Τ
transporter), member 2		
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	T
AMINOBUTYRIC ACID transporter), member 1		

Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		
Superoxide dismutase 1	SOD1	Ε
Superoxide dismutase 3	SOD3	E
Synapsin 1a & 1b	SYN1	N
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle amine transporter	SVAT	N
Synaptogyrin		N
Synaptophysin	SYP	. N
Synaptosomal-associated protein, 25KD	SNAP25	N
Syntaxin 1	STX1	N
Tachykinin receptor, NK1R	TACR1	N
Tachykinin receptor, NK2R	TACR2	N
Tachykinin receptor, NK3R	TACR3	· N
Talin	TLN	, G
TEK, tyrosine kinase, endothelial	TEK	E
Telomerase protein component		E
Transcobalamin 1, TCN1		T
Transcobalamin 2, TCN2	TCN2	Т
Transcription factor, TUPLE1	TUPLE1	· N
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Transthyretin	TTR	T
Trypsin inhibitor		E
Tryptophan 2,3-dioxygenase	TDO2	N
Tryptophan hydroxylase	TPH	E
Tumour necrosis factor (TNF) receptor	TRAF1	1
associated factor 1		
Tumour necrosis factor (TNF) receptor	TRAF2	l
associated factor 2	TD 4 E0	
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3	TD 4 E 4	
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	
	TOACC	•
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	ı
	TDAEC	•
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	l l
	TNICA	
Tumour necrosis factor alpha receptor	TNFA	
Tumour necrosis factor beta	TNFAR	!
Tumour necrosis factor beta receptor	TNFB	
Tyrosinase	TNFBR	· <u> </u>
i yi vəlildəc	TYR	E

Tyrosine hydroxylase	TH	E
Ubiquitin		G
Ubiquitin activating enzyme, E1		Ē
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
Ubiquitin protein ligase E3A	UBE3A	Ē
UDP-glucuronosyltransferase 1	ugt1d, UGT1	E
UDP-glucuronosyltransferase 2	UGT2	Ε
Uridinediphosphate(UDP)-galactose-4-	GALE	Е
epimerase		
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	N
Vesicular monoamine transporter 1	VMAT1	N
Vesicular monoamine transporter 2	VMAT2	N

In an eighth aspect.

CARDIOVASCULAR DISORDERS

The invention relates to a method of assessing the risk of developing the symptoms and consequences of damage, disease or dysfunction of the cardiovascular system.

The cardiovascular system serves to deliver oxygen and nutrients to the body tissues and remove wastes. It also serves to transport components of the immune system to the sites of infection and remove the debris of infection.

Disease and dysfunction of the cardiovascular system is the commonest cause of death in the western world. In the USA some 50% of deaths are attributed to symptoms and consequences of cardiovascular disease, dysfunction and damage disease.

The cardiovascular system includes;

- The pumping activity of the heart including the generation of electrical activities to synchronise cardiac muscle contraction and the systems for altering activity in order to maintain an appropriate arterial pressure.
- The vasculature (arteries, arterioles, capillaries and veins) required to transport blood through vascular beds in order to deliver oxygen and nutrients and remove wastes.
- Blood volume and composition, including water and electrolyte balances (in conjunction with the renal system), lipid composition and the proteins required for clotting and lysis.
- The regulation and control of the cardiovascular system is the relationship between it and the central nervous system. Changes in willed intention or responses to environmental events need to be reflected by changes in the ability of the body to alter levels of activity

Disease or dysfunction of the cardiovascular system will give rise to a variety of symtoms requiring careful examination in order to determine the patho-physiological cause and the appropriate treatment required. Common symptoms are:

Breathlessness

Chest pain

Oedema

Fatigue

Syncope and palpitation

Cardiac cachexia

The diverse physiology of the components of the symptoms and consequences of cardiovascular disease, dysfunction and damage system make it vulnerable to damage or disease by a number of pathological processes such as (Weatherall, Leadingham and Warrell 1996);

Arrythmias

Angina

Ischaemic heart disease

Valve disease

Pericardial disease
Cardiomyopathy
Congenital heart disease
Pulmonary disorders
Hypertension
Atheroma
Cachexia
Circulatory disorders
Coagulation/clotting disorders.
Peripheral arterial disease
Lymphoedema

As a result of this diversity the treatment of cardiovascular disorders is complex and there is a wide range of therapeutic interventions and options.

Conditions involving disorder of the electrical activity of cardiac muscle (arrhythmias) cause a variety of symptoms ranging from discomfort to sudden death. In many cases clinically significant arrythmia is associated with heart disease (e.g. myocardial infarction). Arrhythmias can be classified as supraventricular or ventricular arrythmias and they can be treated by different classes of drug (e.g. digoxin and lignocaine respectively).

Insufficiency of blood to heart muscle can cause the pain associated with angina pectoris. This syndrome is can be treated with drugs which enhance peripheral dilatation such as nitrates, thus reducing venous return. In response to this the ventricular volume is reduced relieving the oxygen defect and reducing the pain.

High blood pressure is associated with decreased life-expectancy and increased risk of stroke, coronary heart disease and other end organ disease (e.g. retinopathy, peripheral neuropathy, renal failure).

In some patients mild hypertension can be controlled by diet restriction, stopping smoking or reducing alcohol consumption. However, in many cases the problems can be alleviated by appropriate drug treatments such as β -adrenoreceptor antagonists, angiotensin converting enzyme inhibitors and calcium channel antagonists.

Diseases of the cardiovascular system can respond well to drug treatments or, in severe cases, transplantation and significant improvements in the management of patients have been made over the last 3 decades. However, many therapeutic interventions carry the risk of adverse events e.g. the potential for neurological damage following cardiac bypass procedures or the adverse consequences following the interactions between calcium channel antagonists and other drugs.

The physiology and control of the body's cardiovascular system and its response to infection and injury is extremely complex and involves the synergistic or inhibitory interaction between multiple regulatory pathways and molecular cascades. Variation in the functionality of the proteins involved in these processes will, inevitably, have an impact on the functioning and success of the patients attempts to minimise damage.

and restore function to the system. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from cardiovascular disease and damage including age, sex, nutritional status, pre-existing disease or injury and drug treatments. Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to cardiovascular disease, dysfunction and damage and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at the heart of the difficulties experienced in the healthcare and social management of injury and infection.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

CARDIOVASCULAR GENE LIST	HUGO gene symbol	Protein function
17beta hydroxysteroid oxidoreductase	-	Ε
2,3-bisphosphoglycerate mutase	BPGM	Ε
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	E
3-oxoacid CoA transferase	OXCT	E
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	E
Acetoacetyl 1-CoA-thiolase	ACAT1	E
Acetoacetyl 2-CoA-thiolase	ACAT2	at a see E
Acetyl CoA acyltransferase	ACAA	Ε
Acetylcholinesterase	ACHE	E
Acid phosphatase 2, lysosomal	ACP2	E
Acidic amino acid transporter		T
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	· S
Activin A receptor, type 2B	ACVR2B	G
Acyl CoA dehydrogenase, long chain	ACADL	E
Acyl CoA dehydrogenase, very long chain	ACADVL	· Е

Adaptin, beta 3A Adducin, alpha Adducin, beta Adenosine deaminase Adenosine receptor A1 Adenosine receptor A2A Adenosine receptor A2B Adenosine receptor A3 Adenosine receptor A3 Adenylate cyclase 1 Adenylate cyclase 2 Adenylate cyclase 3 Adenylate cyclase 4 Adenylate cyclase 5 Adenylate cyclase 5 Adenylate cyclase 6 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 9	ADTB3A ADD1 ADD2 ADA ADORA1 ADORA2A ADORA2B ADORA3 ADCY1 ADCY2 ADCY3 ADCY4 ADCY5 ADCY5 ADCY6 ADCY7 ADCY8 ADCY9	
Adenylate kinase Adrenergic receptor, alpha1 Adrenergic receptor, alpha2 Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH) receptor Alanine aminotransferase	AK1 ADRA1 ADRA2 ADRB1 ADRB2 ADRB3 ACTHR	EZZZZZG
Alanine-glyoxylate aminotransferase Albumin, ALB Alcohol dehydrogenase 1 Alcohol dehydrogenase 2 Alcohol dehydrogenase 3 Alcohol dehydrogenase 5 Alcohol dehydrogenase 6 Alcohol dehydrogenase 7 Aldehyde dehydrogenase 10 Aldehyde dehydrogenase 2 Aldehyde dehydrogenase 2 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 7 Aldolase A Aldolase B Aldolase C Aldosterone receptor Alpha 1 acid glycoprotein Alpha 2 macroglobulin alpha1-antitrypsin alpha2-antiplasmin	AGXT ALB ADH1 ADH2 ADH3 ADH5 ADH6 ADH7 ALDH1 ALDH10 ALDH2 ALDH5 ALDH6 ALDH6 ALDH7 ALDOA ALDOB ALDOC MLR AAG; AGP A2M PI PLI	

alpha-actinin 2	ACTN2	G
alpha-actinin 3	ACTN3	G
alpha-Galactosidase A	GLA	
alpha-L-Iduronidase	IDUA	E
Aminopeptidase P	XPNPEP2	E
Amphiregulin	AREG	E
Amylo-1,6-glucosidase	AGL	G
Angiopoietin 1	AGL ANGPT1	E
Angiopoietin 2	ANGPT1 ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	G
Angiotensin receptor 1	AGTR1	E T
Angiotensin receptor 2	AGTR1	
Angiotensinogen		T
Ankyrin 1	AGT	E
Ankyrin 2	ANK1	S
Ankyrin 3	ANK2	S
Annexin 1	ANK3	S
Antidiuretic hormone receptor	ANX 1	1
Antithrombin III	ADHR	Ţ
Apolipoprotein (a)	AT3	E
Apolipoprotein (a) Apolipoprotein A 4	LPA	, <u>T</u>
Apolipoprotein A I	APOA4	Ŧ
Apolipoprotein A II	APOA1	T
Apolipoprotein B	APOA2	T
Apolipoprotein C1	APOB	Ī
Apolipoprotein C2	APOC1	T
Apolipoprotein C3	APOC2	T
	APOC3	T
Apolipoprotein D Apolipoprotein E	APOD	T
Apolipoprotein H	APOE	T
Aquaporin 1	APOH	T
Aquaporin 2	AQP1	T
	AQP2	T
Arginine vasopressin	AVP	N
Arginine vasopressin receptor 1A	AVPR1A	N
Arginine vasopressin receptor 1B	AVPR1B	N
Arginine vasopressin receptor 2	AVPR2	N
Arginosuccinate lyase	ASL	E
Arylsulfatase B	ARSB	E
Aspartylglucosaminidase	AGA	E
Ataxia telangiectasia gene, AT	ATM	G
ATP/ADP translocase		Ε
ATP-binding cassette transporter 7	ABC7	1
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
Autoimmune regulator, AIRE	AIRE	1
BCL2-related protein A1	BCL2A1	G

beta 2 microglobulin	B2M	1
beta-endorphin receptor	DAAT	N
Bile acid coenzyme A: amino acid N-	BAAT	Ε
acyltransferase	5055 55100	_
Bile salt export pump	BSEP, PFIC2	T
Bile salt-stimulated lipase	CEL	Ε
Bilirubin UDP-glucuronosyltransferase	,	Ε
Bloom syndrome protein	BLM	G
Bradykinin receptor B1		1
Bradykinin receptor B2	•	1
Butyrylcholinesterase	BCHE	E
Ca(2+) transporting ATPase, fast twitch	ATP2A1	Т
Ca(2+) transporting ATPase, slow twitch	ATP2A2	Т
Cadherin E	CDH1	G
Cadherin EP		Ğ
Cadherin N	CDH2	Ğ
Cadherin P	CDH3	Ğ
Calbindin 1	CALB1	Ğ
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	ī
Calcineurin A2	CALNA2	i
Calcineurin A3	CALNA3	i
Calcineurin B	CALIVAS	-
	CACNA1F	I NI
Calcium channel, voltage-dependent, alpha	CACNATE	Ν
1F subunit	CACNIAAD	
Calcium channel, voltage-dependent, Alpha-	CACNATB	Ν
1B (CACNL1A5)	0.40114.0	
Calcium channel, voltage-dependent, Alpha-	CACNA1C	N
1C .		
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	Ν
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3	CACNB3	Ν
Calcium channel, voltage-dependent, L type,	CACNA1S	N.
alpha 1S subunit		
Calcium channel, voltage-dependent,	CACNG2	Ν
Neuronal, Gamma		
Calcium channel, voltage-dependent, P/Q	CACNA1A	N
type, alpha 1A subunit		
Calcium channel, voltage-dependent, T-type		Ν
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
	CALIVIS CAMK2A	G
Calmodulin-dependant protein kinase II	UMIVINAM	G

Calpain Calretinin Carbonic anhydrase 3 Carbonic anhydrase 4 Carbonic anhydrase, alpha Carbonic anhydrase, beta Carboxypeptidase Cardiac-specific homeobox, CSX Carnitine acylcarnitine translocase Carnitine transporter protein Cartilage-hair hypoplasia gene Catechol-O-methyltransferase Caveolin 3 CD1 CD4 Cdc 25 phosphatase	CAPN, CAPN3 CALB2 CA3 CA4 CA1 CA2 CPN CSX CACT CDSP, SCD CHH COMT CAV3 CD1 CD4	ENEEEEGETNEEIIG
Cell adhesion molecule, intercellular, !CAM Cell adhesion molecule, leukocyte-	ICAM1 LECAM1	G
endothelial, LECAM (CD62)	LECAIVIT	G
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM1	G
••	1/04144	_
Cell adhesion molecule, vascular, VCAM Cellubrevin	VCAM1	G
	CEB	N
Ceroid lipofuscinosis neuronal 3	CLN3	N
Ceruloplasmin precursor	CP	E
Chemokine receptor CCR2	CCR2	1
Chemokine receptor CCR3	CCR3	
Chemokine receptor CCR5 Chemokine receptor CXCR1	CCR5	!
Chemokine receptor CXCR2	CXCR1	!
Chemokine receptor CXCR2 Chemokine receptor CXCR4	CXCR2	į ,
Chloride channel KB	CXCR4	1
Cholestasis, progressive familial intrahepatic	CLCNKB	S
1 gene	FIC1	G
Cholesterol ester transfer protein	CETP	
Choline acetyltransferase		Ţ
Chymase	CHAT CHY1	E
Clathrin	CHTT	т
Cockayne syndrome gene, CKN1	CKN1	T
Collagen I alpha 1	COL1A1	G
Collagen I alpha 2	COL1A1	S S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	
Collagen IV alpha 1	COL3A1	S S
 	JULTAI	3

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Collagen IV alpha 2 Collagen IV alpha 3 Collagen IV alpha 4 Collagen IV alpha 5 Collagen IV alpha 6 Collagen IX alpha 2 Collagen IX alpha 3 Collagen receptor Collagen V alpha 1 Collagen V alpha 2 Collagen VI alpha 1 Collagen VI alpha 3 Collagen VI alpha 3 Collagen VI alpha 3 Collagen VI alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen XI alpha 1 Collagen XVII alpha 1 Collagen XVII alpha 1 Collagen ic-like tail subunit of asymmetric	COL4A2 COL4A3 COL4A4 COL4A5 COL4A6 COL9A2, EDM2 COL9A3 COLR COL5A1 COL5A2 COL6A1 COL6A2 COL6A3 COL7A1 COL10A1 COL11A1 COL11A1 COL11A2 COL17A1 COLQ	00000000000000000000000000000000000000
acetylcholinesterase	COLQ	=
Colony-stimulating factor 2 beta receptor	CSF2RB	G
Colony-stimulating factor 3	CSF3	G
Colony-stimulating factor 3 receptor	CSF3R	G
Corticosteroid binding globulin	CBG	N
Cortico-steroid binding protein		Т
Corticotrophin-releasing hormone	CRH	T
Corticotrophin-releasing hormone receptor	CRHR1	T
Creb binding protein	CREBBP	G
Cu2+ transporting ATPase alpha polypeptide		Ε
Cu2+ transporting ATPase beta polypeptide	ATP7B	Ε
Cubilin	CUBN	T
Cyclic AMP-dependent protein kinase	PKA	Ε
Cyclin-dependent kinase 2	CDK2	G
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN1C	G
Cyclooxygenase 1	COX1	Ε
Cyclooxygenase 2	COX2	Ε
CYP11A1	CYP11A1	- E-
CYP11B1	CYP11B1	E
CYP11B2	CYP11B2	Ε
CYP17	CYP17	Ε
CYP19	CYP19	Ε
CYP1A1	CYP1A1	Ε
CYP1A2	CYP1A2	Ε
CYP1B1	CYP1B1	E
CYP21	CYP21	Е
CYP24	CYP24	Ε
CYP27	CYP27	Ε

CYP27B1	PDDR	Ε
CYP2A1	CYP2A1	Ē
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	Ē
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A7	E
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	
CYP2C19	CYP2C18	E
CYP2C8	CYP2C19 CYP2C8	E
CYP2C9		
CYP2D6	CYP2C9	E
CYP2E1	CYP2D6	E
CYP2F1	CYP2E1	Ε
CYP2J2	CYP2F1	E
	CYP2J2	E
CYP3A3	CYP3A3	E
CYP3A4	CYP3A4	E
CYP3A5	CYP3A5	Ε
CYP3A7	CYP3A7	Ε
CYP4A11	CYP4A11	Е
CYP4B1	CYP4B1	Ε
CYP4F2	CYP4F2	E
CYP4F3	CYP4F3	Ε
CYP51	CYP51	Ε
CYP5A1	CYP5A1	Ε
CYP7A	CYP7A	Ε
CYP8	CYP8	Ε
Cystathionase	CTH	E
Cystathione beta synthase	CBS	Ε
Cytidine deaminase	CDA	Ε
Cytidine-5-prime-triphosphate synthetase	CTPS	Ε
Cytochrome a		Ε
Cytochrome b-5	CYB5	Ε
Cytochrome c		Ε
Cytochrome c oxidase, MTCO		Ε
DAX1 nuclear receptor	DAX1	1
Delta aminolevulinate dehydratase	ALAD	Ē
Delta(4)-3-oxosteroid 5-beta-reductase		E
Delta-7-dehydrocholesterol reductase	DHCR7	E
Deoxycorticosterone (DOC) receptor		Ē
Desmin	DES	s
Dihydrodiol dehydrogenase 1	DDH1	E
Dihydrofolate reductase	DHFR	E
Dihydrolipoyl dehydrogenase		E
Dihydrolipoyl dehydrogenase 2	PDHA	E
Dihydrolipoyl transacetylase	PDHA	E
DM-Kinase	DMPK	E
DOPA decarboxylase	DDC	E
		_

Dopamine beta hydroxylase Dopamine receptors D1 Dopamine receptors D2 Dopamine receptors D3 Dopamine receptors D4 Dopamine receptors D5 Duffy blood group Dynamin Dystrophia myotonica Dystrophia myotonica, atypical Dystrophin Elastin Emerin Endocardial fibroelastosis 2 gene Endoglin Endometrial bleeding-associated factor Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Enolase Enoyl CoA isomerase Ephrin receptor tyrosine kinase A Ephrin receptor tyrosine kinase B	DBH DRD1 DRD2 DRD3 DRD4 DRD5 FY DNM1 DM, DMPK DM2 DMD ELN EMD EFE2 ENG EBAF EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB ENO1 EPHA EPHB	田ススススストの田田のの干のののスススススエ田田のの
Epidermal growth factor Epidermal growth factor receptor	EGF EGFR	G G
Erythrocyte membrane protein band 4.1	EPB41	S
Erythrocyte membrane protein band 4.2	EPB42	S
Erythrocyte membrane protein band 7.2 Erythroid kruppel-like factor	EPB72 EKLF	S G
Erythropoietin	EPO	J
Erythropoietin receptor	EPOR	i
Estrogen receptor	ESR	G
Faciogenital dysplasia	FGD1, FGDY	T
Factor 1 (No. one)	F1	I
Factor B, properdin	King the second	l
Factor D		ļ
Factor H	HF1	ļ
Factor I (letter I) Factor III	IF	i
Factor IX	F3 F9	1
Factor V	F5	1
Factor VII	F7	1
Factor VIII	F8 .	i
Factor X	F10	i
Factor XI	F11	İ

Fastas VII		
Factor XII	F12	1
Factor XIII A & B	F13A & F13B	1
Fanconi anemia, complementation group A	FANCA	Т
Fanconi anemia, complementation group C	FANCC	Ť
Fanconi anemia, complementation group D	FANCD	Ť
Fatty acid binding proteins FABP1		Ť
Fatty acid binding proteins FABP2	FABP2	Ť
Fatty acid binding proteins FABP3	17.51 2	Ť
Fatty acid binding proteins FABP4		
Fatty acid binding proteins FABP5	•	Ţ
Fatty acid binding proteins FABP6		T
Fc fragment of IgG, high affinity IA, receptor	E00B4A	T
for	FCGR1A	G
Fc fragment of IgG, low affinity IIa, receptor	FCGR2A	G
for (CD32)		
Fc fragment of IgG, low affinity Illa, receptor	FCGR3A	G
for (CD16)		
Fibrillin 1	FBN1	G
Fibrillin 2	FBN2	G
Fibrinogen alpha	FGA	S
Fibrinogen beta	FGB	S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	Ğ
Fibroblast growth factor receptor 3	FGFR3	Ğ
Fibronectin precursor	FN1	Ğ
Flightless-II, Drosophila homolog of	FLII	Ğ
Follicle stimulating hormone receptor	FSHR, ODG1	Ğ
Follicle stimulating hormone, FSH	FSHB	Ğ
Formiminotransferase		Ē
Fragile site, folic acid type, rare, fra(X) A	FRAXA	N
Fucosidase alpha-L-2	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	E
Fucosyltransferase 2	FUT2	T
Fucosyltransferase 3	FUT3	Ť
Fucosyltransferase 6	FUT6	Ť
Fukuyama type congenital muscular	FCMD	Ġ
dystrophy	CIVID	G
GABA receptor, alpha 1	GABRA1	NI.
GABA receptor, alpha 2	GABRA2	N
GABA receptor, alpha 3	GABRA3	N
GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5		N
GABA receptor, alpha 6	GABRAS	N
	GABRA6	N
GABA receptor, beta 1	GABRB1	N
GABA receptor, beta 2	GABRB2	N
GABA receptor, beta 3	GABRB3	N
GABA receptor, gamma 1	GABRG1	Ν

GABA receptor, gamma 2 GABA receptor, gamma 3 GABA transaminase Galactose 1-phosphate uridyl-transferase Galactosyltransferase 1 Galactosyltransferase, alpha 1,3 Galactosyltransferase, beta 3 Galanin Galanin receptor Gamma-glutamyl carboxylase Gap junction protein alpha 1 Gap junction protein beta 1 Gap junction protein beta 2 Glucocorticoid receptor Glucosaminyl (N-acetyl) transferase 2, l-	GABRG2 GABRG3 ABAT GALT GT1 GGTA1 B3GALT GAL GALNR1 GGCX GJA1 GJB1 GJB2 GRL GCNT2	N N E E G G G N N T T T T G E
Branching enzyme Glucosidase, acid alpha Glucosidase, acid beta Glutamate decarboxylase, GAD Glutamate receptor 1 Glutamate receptor 2 Glutamate receptor 3 Glutamate receptor 5 Glutamate receptor 6 Glutamate receptor 7 Glutamate receptor, ionotropic, NMDA 1 Glutamate receptor, ionotropic, NMDA 2A Glutamate receptor, ionotropic, NMDA 2B Glutamate receptor, ionotropic, NMDA 2C Glutamate receptor, ionotropic, NMDA 2C Glutamate receptor, ionotropic, NMDA 2D Glutamate receptor, ionotropic, NMDA 2D Glutamate-cysteine ligase Glutaryl-CoA dehydrogenase Glutathione Glutathione peroxidase, GPX1 Glutathione reductase, GSR Glutathione S-transferase, GSTZ1 Glyceraldehyde-3-phosphate	GAA GBA GAD1 GLUR1 GLUR2 GLUR3 GLUR4 GLUR5 GLUR6 GLUR7 NMDAR1 NMDAR2A NMDAR2B NMDAR2C NMDAR2D GLCLC GCDH GSH GPX1 GSR GSTZ1 GAPDH	
dehydrogenase, GAPDH Glycerol kinase Glycinamide ribonucleotide (GAR)	GK GART	E
transformylase Glycophorin A Glycophorin B Glycophorin C Glycosyltransferases, ABO blood group Growth arrest-specific homeobox Guanine nucleotide-binding protein, alpha	GYPA GYPB GYPC ABO GAX GNAO1	SSEGN

activating activity polypeptide, GNAO		
Guanine nucleotide-binding protein, alpha	GNAI1	NI.
inhibiting activity polypeptide 1, GNAI1	ONAH	. N
Guanine nucleotide-binding protein, alpha	GNAI2	N
inhibiting activity polypeptide 2, GNAI2	0117112	14
Guanine nucleotide-binding protein, alpha	GNAI3	N
inhibiting activity polypeptide 3, GNAI3	J. 1, 110	, .
Guanine nucleotide-binding protein, alpha	GNAS1	N
stimulating activity polypeptide, GNAS1		• • •
Guanine nucleotide-binding protein, alpha	GNAS2	N
stimulating activity polypeptide, GNAS2	•	• • •
Guanine nucleotide-binding protein, alpha	GNAS3	N
stimulating activity polypeptide, GNAS3		
Guanine nucleotide-binding protein, alpha	GNAS4	N
stimulating activity polypeptide, GNAS4		
Guanine nucleotide-binding protein, beta	GNB3	N
polypeptide 3		
Guanine nucleotide-binding protein, gamma	GNG5	N
polypeptide 5		•
Guanine nucleotide-binding protein, q	GNAQ	N
polypeptide		
Guanylyl cyclase		E
H(+), K(+) - ATPase	ATP4B	N
Haemoglobin alpha 1	HBA1	Ţ
Haemoglobin alpha 2	HBA2	T
Haemoglobin beta	HBB	T
Haemoglobin delta	HBD	Ţ
Haemoglobin epsilon	LIBO4	T
Haemoglobin gamma A Haemoglobin gamma B	HBG1	Ţ
Haemoglobin gamma G	HBG2	Ţ
Haptoglobin, alpha 1	HBGG HPA1	T
Haptoglobin, alpha 2	HPA2	!
Haptoglobin, beta	HPB	į.
Heat shock protein, HSP60	пго	;
Heat shock protein, HSP70		:
Heat shock protein, HSP90		1
Heat shock protein, HSPA1	•	1
Heat shock protein, HSPA2	• • • • • • • • • • • • • • • • • • • •	1
Hemochromatosis	HFE	Ť
Hemopexin	HPX	1
Heparan sulfamidase	111 /	Ė
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	Ī
Hepatic lipase	LIPC	Ė
Hermansky-pudlak syndrome gene	HPS	· Ŧ
Hexokinase 1	HK1	Ė
Hexosaminidase A	HEXA,TSD	Ē
	•	_

Hexosaminidase B Histidine-rich glycoprotein HLA-B associated transcript 1 HLH transcription factor HAND1 HLH transcription factor HAND2 HMG-CoA lyase HMG-CoA reductase HMG-CoA synthase HMG-CoA synthase HMGCS2 Homeobox (HOX) gene A13 Homeobox HB24 HOXA13 Hormone-sensitive lipase HEXB HARG HARG HARG HARG HARG HAND1 HAND2 HAND2 HAND2 HMGCL HMGCR HMGCS2 HMGCS2 HOXA13 HOXA13	ET-GGEEEGGE
Human chorionic gonadtrophin, hCG CG	G
Human placental lactogen CSH1	G
Hypoxanthine-guanine HPRT phosphoribosyltransferase, HGPRT	E
Hypoxia inducible factor 1 HIF1A	Ε
Hypoxia inducible factor 2	Ē
IC7 A and B	1
Iduronate 2 sulphatase IDS	E
Indian hedgehog, ihh	G
Inosine triphosphatase ITPA	E
Inositol 1,4,5-triphosphate receptor 1 ITPR1	G
Inositol 1,4,5-triphosphate receptor 3 ITPR3	G
Inositol monophosphatase IMPA1	N
Inositol polyphosphate 1-phosphatase INPP1	N
Insulin INS	G
Insulin receptor INSR	G
Insulin receptor substrate-1 IRS1	G
Insulin-like growth factor 1 IGF1	G
Insulin-like growth factor 1 receptor IGF1R	G G
Insulin-like growth factor 2 IGF2 Insulin-like growth factor 2 receptor IGF2R	
3	G G
Integrin beta 1 ITGB1 Integrin beta 2 ITGB2	G
	G
· ·	G
Integrin beta 4 ITGB4 Integrin beta 5 ITGB5	G
Integrin beta 5 ITGB6	G.
Integrin beta 7 ITGB7	G
Integrin, alpha 1 ITGA1	G
Integrin, alpha 2 ITGA2	G
Integrin, alpha 3 ITGA3	Ğ
Integrin, alpha 4 ITGA4	Ğ
Integrin, alpha 5 ITGA5	Ğ
Integrin, alpha 6 ITGA6	Ğ
Integrin, alpha 7 ITGA7	Ğ
Integrin, alpha 8 ITGA8	Ğ
Integrin, alpha 9 ITGA9	Ğ

Integrin, alpha M	ITGAM	G
Integrin, alpha X	ITGAX	G
Inter-alpha-trypsin inhibitor, IATI		E
Intercellular adhesion molecule 1	ICAM1	1
Intercellular adhesion molecule 2	ICAM2	, 1
Intercellular adhesion molecule 3	ICAM3	
Interferon alpha	IFNA1	i
Interferon beta	IFNB	1
Interferon gamma	IFNG	1
Interferon gamma receptor 1	IFNGR1	!
Interferon gamma receptor 2	IFNGR2	1
Interleukin(IL) 1 receptor		l l
Interleukin(IL) 1, alpha	IL1R	!
	IL1A	ļ
Interleukin(IL) 1, beta	IL1B	
Interleukin(IL) 10	IL10	!
Interleukin(IL) 10 receptor	IL10R	1
Interleukin(IL) 11	IL11	1
Interleukin(IL) 11 receptor	IL11R	1
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	ı
Interleukin(IL) 13	IL13	
Interleukin(IL) 13 receptor	IL13R	1
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	1
Interleukin(IL) 2 receptor, gamma	IL2RG	1
Interleukin(IL) 3	IL3	1
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	1
Interleukin(IL) 4 receptor	IL4R	1
Interleukin(IL) 5	IL5	ŀ
Interleukin(IL) 5 receptor	IL5R	1
Interleukin(IL) 6	IL6	. 1
Interleukin(IL) 6 receptor	IL6R	1
Interleukin(IL) 7	IL7	l
Interleukin(IL) 7 receptor	IL7R	1
Interleukin(IL) 8	IL8	ĺ
Interleukin(IL) 8 receptor	IL8R	i
Interleukin(IL) 9	IL9	i
Interleukin(IL) 9 receptor	IL9R	i
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	i
P3 kinase		Ė
sovaleric acid CoA dehydrogenase	IVD	Ē
Kallikrein 3	KAK3	<u></u>
Kell blood group precursor	XK, KEL	Ť
Ketohexokinase	KHK	E
Kininogen, High molecular weight	KNG	<u> </u>
Kynureninease	TATO :	Ė
_actate dehydrogenase, A	LDHA	Ē
, , ,		

	*	
Lactate dehydrogenase, B	LDHB	Ε
Lamin A/C	LMNA	G
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	Ğ
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta	LTBP2	G
binding protein 2		0
Lecithin-cholesterol acyltransferase	LCAT	Ε
Lectin, mannose-binding 1	LMAN1	<u> </u>
Lectin, mannose-binding 2	MBL2	1
Leptin	LEP	<u>*</u>
Leptin receptor	LEPR	G
· · · · · · · · · · · · · · · · · · ·		G
Leukocyte-specific transcript 1	LST-1	
Leukotriene A4 synthase	LTA4S	E
Leukotriene B4 receptor	L TD4C	1
Leukotriene B4 synthase	LTB4S	E
Leukotriene C4 synthase	LTC4S	E
LIM homeobox protein 1	LHX1	G
Lipocortin 1	ANX4	1
Lipoprotein lipase	LPL	<u>.</u>
Lipoprotein receptor, Low Density	LDLR	Ţ
Lipoprotein, High Density	HDLDT1	<u>T</u>
Lipoprotein, Very Low Density	VLDLR	T
Lipoprotein-associated coagulation factor	LACI	1
Lipoxygenase		E
Lipoxygenase 12 (platelets)	LOG12	1
Long QT-type 2 potassium channels	LQT2, KCNH2	Т
Low density lipoprotein receptor-related	LRP	Т
protein precursor		
Lymphoid enhancer-binding factor	LEF-1	G
Lysosomal acid lipase	LIPA	Ε
Macrophage inflammatory protein-2	MIP2	1
MAD (mothers against decapentaplegic,	MADH4	G
Drosophila) homologue 4		
MADS box transcription-enhancer factor 2A	MEF2A	G
MADS box transcription-enhancer factor 2B	MEF2B	G
Mannosidase, alpha B lysosomai	MANB	E
Matrix Gla protein	MGP	G
Matrix metalloproteinase 1	MMP1	E
Matrix metalloproteinase 10	MMP10	Ε
Matrix metalloproteinase 11	MMP11	Ε
Matrix metalloproteinase 12	MMP12	Ē
Matrix metalloproteinase 13	MMP13	Ē
Matrix metalloproteinase 14	MMP14	Ē
Matrix metalloproteinase 15	MMP15	E
Matrix metalloproteinase 16	MMP16	Ē
•		-

Matrix metalloproteinase 18 Matrix metalloproteinase 19 Matrix metalloproteinase 2 Matrix metalloproteinase 2 Matrix metalloproteinase 3 Matrix metalloproteinase 4 Matrix metalloproteinase 5 Matrix metalloproteinase 6 Matrix metalloproteinase 7 Matrix metalloproteinase 7 Matrix metalloproteinase 8 Matrix metalloproteinase 9 Melanocortin 2 receptor Melanocortin 4 receptor Methionine synthase Methionine synthase reductase Methylmalonyl-CoA mutase Mevalonate kinase MHC Class I: A MHC Class I: B MHC Class I: C MHC Class I: LMP-2, LMP-7	MMP17 MMP18 MMP19 MMP2 MMP3, STMY1 MMP4 MMP5 MMP6 MMP7 MMP8 MMP9 MC2R MC4R MTR MTRR MTRR MUT MVK	
MHC Class I: Tap1	ABCR, TAP1	I
MHC Class II: DP	HLA-DPB1	l
MHC Class II: DQ MHC Class II: DR		- 1
MHC Class II: DR	TAP2, PSF2	- 1
MHC Class II: Complementation group A	MHC2TA	1
MHC Class II:Complementation group B	rfxank	1
MHC Class II:Complementation group C	RFX5	1
MHC Class II:Complementation group D	RFXAP	i
Microsomal triglyceride transfer protein	MTP	÷
Mismatch repair gene, PMSL2	PMS2	Ġ
Mitochondrial trifunctional protein, alpha	HADHA	E
subunit		_
Mitochondrial trifunctional protein, beta	HADHB	Ε
subunit		
Molybdenum cofactor synthesis 1	MOCS1	Ε
Molybdenum cofactor synthesis 2	MOCS2	E
Monoamine oxidase A	MAOA	E
Monoamine oxidase B	MAOB	Ε
Monocyte chemoattractant protein 1	MCP1	-
Mucolipidoses	GNPTA	Ε
Mulibrey nanism	MUL	T
Muscarinic receptor, M1	CHRM1	Ν
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	Ν
Muscarinic receptor, M4	CHRM4	Ν
Muscarinic receptor, M5	CHRM5	Ν

MutS homolog 3	MSH3	G
Myoglobin		, <u>T</u>
Myosin, cardiac	MYH7	S
Myosin, light chain 2	MYL2	S
Myosin, light chain 3	MYL3	· S
Myosin-binding protein C, cardiac	MYBPC3	S
Myotubularin	MTM1	S
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3	G
Na+/H+ exchanger 1	NHE1	Т
Na+/H+ exchanger 2	NHE2	Т
Na+/H+ exchanger 3	NHE3	Т
Na+/H+ exchanger 4	NHE4	Ť
Na+/H+ exchanger 5	NHE5	Ť
N-acetylglucosamine-6-sulfatase	GNS	Ė
NADPH oxidase	,	ī
NADPH-dependent cytochrome P450	POR ·	Ē
reductase	, 5,1	_
NB6		. 1
Nebulin	NEB	Ś
Nephronophthisis 1	NPHP1	T
Neuraminidase sialidase	NEU	Ť
Neuregulin	HGL	Ġ
Neurite inhibitory protein	IIOL	N
Neuroendocrine convertase 1	NEC1, PCSK1	E
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Neutrophil cystolic factor 1		N
· ·	NCF1	!
Neutrophil cystolic factor 2	NCF2	1 T
Niemann-Pick disease protein	NPC1	I.
Nitric oxide synthase 1, NOS1	NOS1	Ē
Nitric oxide synthase 2, NOS2	NOS2	E
Nitric oxide synthase 3, NOS3	NOS3	E
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL	1
Oncogene sis	PDGFB	G
Oncostatin M	OSM	G
Oncostatin M receptor	OSMR	G
Osteonectin	ON	G
Osteopontin	OPN	G
Osteoprotegerin	OPG	G
Pancreatic lipase	PNLIP	Ε
Pancreatic lipase related protein 1	PLRP1	Ε

Pancreatic lipase related protein 2	PLRP2	Ε
Paraoxonase PON1	PON1	E
Paraoxonase PON2	PON2	E
Paraoxonase PON3	1 0112	E
Parvalbumin	PVALB	G
Patched (Drosophila) homolog, PTCH	PTCH	
PCNA (proliferating cell nuclear antigen)	PICH	G
Pepsinogen		Ε
Peroxidase, salivary	CADV	E
	SAPX	E
Peroxisomal membrane protein 1	PXMP1	S
Peroxisomal membrane protein 3	PXMP3	T
Peroxisome biogenesis factor 1	PEX1	T
Peroxisome biogenesis factor 19	PEX19	T
Peroxisome biogenesis factor 6	PEX6	T
Peroxisome biogenesis factor 7	PEX7	T
Peroxisome proliferative activated receptor,	PPARA	Т
alpha		
Peroxisome proliferative activated receptor,	PPARG	Т
gamma	•	
Peroxisome receptor 1	PXR1	Т
P-glycoprotein 3	PGY3	Т
Phosphatidylinositol glycan, class A	PIGA	Ġ
(paroxysmal nocturnal hemoglobinuria)		_
Phosphatidylinositol transfer protein	PITPN	G
Phosphofructokinase, muscle	PFKM	E
Phosphoglucose isomerase	GPI	Ē
Phospholipase A2, group 10	PLA2G10	Ī
Phospholipase A2, group 1B	PLA2G1B	1
Phospholipase A2, group 2A	PLA2G2A	1
Phospholipase A2, group 2B	PLA2G2B	
Phospholipase A2, group 4A	PLA2G2B	1
Phospholipase A2, group 4C	PLA2G4C	1
Phospholipase A2, group 5	PLA2G5	
Phospholipase A2, group 6	PLA2G6	1
Phospholipase C alpha	PLAZGO	
Phospholipase C beta		1 .
Phospholipase C delta	DI 0D4	!
•	PLCD1	ı
Phospholipase C epsilon		ł
Phospholipase C gamma	PLCG1	ı
Phosphomannomutase-2	PMM2	T
Phosphoribosyl pyrophosphate synthetase	PRPS1	Ε
Phosphorylase kinase, alpha 2	PHKA2	E
Phytanoyl-CoA hydroxylase	PHYH	G
Plasminogen	PLG	E
Plasminogen activator inhibitor 1	PAI1	Ε
Plasminogen activator inhibitor 2	PAI2	Ε
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	s
Plasminogen activator, Tissue	PLAT; TPA	Ē
	•	_

Plasminogen activator, Urokinase Platelet derived growth factor Platelet derived growth factor receptor Platelet glutaminase Platelet glycoprotein 1b, alpha Platelet glycoprotein 1b, beta Platelet glycoprotein 1b, gamma Platelet glycoprotein IX Platelet glycoprotein V Platelet monamine oxidase Platelet-activating factor acetylhydrolase 1B	UPA; PLAU PDGF PDGFR GLS GP1BA GP1BB GP1BG GP9 GP5 PAFAH1B1 or	EGGT
Platelet-activating factor acetylhydrolase 2 Platelet-activating factor receptor Poly (ADP-ribose) synthetase Polycystic kidney and hepatic disease 1 Polycystin 1 Polycystin 2	LIS1 PAFAH2 PAFR PARS PKHD1 PKD1 PKD2	IETT
Potassium inwardly-rectifying channel J1 Potassium inwardly-rectifying channel J11 Potassium voltage-gated channel A1 Potassium voltage-gated channel E1 Potassium voltage-gated channel Q1 Potassium voltage-gated channel Q2 Potassium voltage-gated channel Q3	KCNJ1 KCNJ11 KCNA1 KCNE1 KCNQ1 KCNQ2 KCNQ3	
POU domain, class 1, transcription factor 1 (Pit1) Prekallikrein Procollagen N-protease Progesterone receptor (RU486 binding receptor)	POU1F1 PGR	G I E G
Pro-melanin-concentrating hormone Proopiomelanocortin Prostaglandin (PG) D synthase, hematopoietic	PMCH POMC PGDS	G N E
Prostaglandin E2 receptor Prostaglandin-endoperoxidase synthase 2 Protease inhibitor 1 Protease nexin 2 Protective protein for beta-galactosidase Protein C Protein C inhibitor Protein S Prothrombin precursor Protoporphyrinogen oxidase Purine nucleoside phosphorylase Purinergic receptor P1A1 Purinergic receptor P1A2	PTGS2 PN2 PPGB PROC PCI PROS1 F2 PPOX NP	- G F E E E E Z Z

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Purinergic receptor P1A3		Ν
Purinergic receptor P2X, 1	P2RX1	Ν
Purinergic receptor P2X, 2	P2RX2	Ν
Purinergic receptor P2X, 3	P2RX3	Ν
Purinergic receptor P2X, 4	P2RX4	Ν
Purinergic receptor P2X, 5	P2RX5	Ν
Purinergic receptor P2X, 6	P2RX6	N
Purinergic receptor P2X, 7	P2RX7	N
Purinergic receptor P2Y, 1	P2RY1	N
Purinergic receptor P2Y, 11	P2RY11	N
Purinergic receptor P2Y, 2	P2RY2	N
Pyruvate carboxylase	PC	Ε
Pyruvate decarboxylase	PDHA	E
Pyruvate kinase	PKLR	E
Radixin	RDX	s
Renin	REN	Ē
Replication factor C	RFC2	Ē
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoid X receptor, alpha	RXRA	G
Retinoid X receptor, beta	RXRB	G
Retinoid X receptor, gamma	RXRG	G
Rhesus blood group, CcEe antigens	RHCE	T
Rhesus blood group, D antigen	RHD	T
Rhesus blood group-associated glycoprotein	RHAG	T
Ribosomal protein S19	RPS19	E
RIGUI	RIGUI	G
S100 calcium-binding protein A1	S100A1	Ν
S100 calcium-binding protein A2	S100A2	Ν
S100 calcium-binding protein A3	S100A3	Ν
S100 calcium-binding protein A4	S100A4	Ν
S100 calcium-binding protein A5	S100A5	Ν
S100 calcium-binding protein A6	S100A6	Ν
S100 calcium-binding protein A7	S100A7	Ν
S100 calcium-binding protein A8	S100A8	Ν
S100 calcium-binding protein A9	S100A9	Ν
S100 calcium-binding protein B	S100B	Ν
S100 calcium-binding protein P	S100P	Ν
SA homolog	SAH	G
SAP (SLAM-associated protein)	SH2D1A	1
Secretase, alpha		N
Secretase, beta	, .	N
Secretase, gamma		Ν
Selectin E	SELE	Ν
Selectin L	SELL	N ·
Selectin P	SELP	Ν
Serotonin receptor, 5HT1A	HTR1A	Ν
•		

Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Serum amyloid A	SAA	T
Serum amyloid P	SAP	
Sjoegren (Sjogren) syndrome antigen A1	SSA1	Ţ
Sodium channel, non-voltage gated 1, alpha	SCNN1A	
Sodium channel, non-voltage gated 1, beta		N
· · · · · · · · · · · · · · · · · · ·	SCNN1B SCNN1G	N
Sodium channel, non-voltage gated 1, gamma	SCININTG	N
Sodium channel, voltage gated, type IV,	SCN4A	N
alpha polypeptide	JONAN	IN
Sodium channel, voltage gated, type V, alpha	SCN5A	N
polypeptide		•
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide	332	••
Solute carrier family 1 (glutamate	SLC1A1	Т
transporter), member 1		•
Solute carrier family 1 (glutamate	SLC1A2	Т
transporter), member 2		·
Solute carrier family 10 (sodium/bile acid	SLC10A1	Т
cotransporter family),member 1		•
Solute carrier family 10 (sodium/bile acid	SLC10A2	Т
cotransporter family),member 2		•
Solute carrier family 12, member 1	SLC12A1	T
Solute carrier family 12, member 2	SLC12A2	Ť
Solute carrier family 12, member 3	SLC12A3	Ť
Solute carrier family 2 (facilitated glucose	SLC2A1	· 🕇
transporter), member 1		•
Solute carrier family 2 (facilitated glucose	SLC2A2	Т
transporter), member 2		•
Solute carrier family 2 (facilitated glucose	SLC2A3	Т
transporter), member 3		•
Solute carrier family 2 (facilitated glucose	SLC2A4	Т
transporter), member 4		•
Solute carrier family 2 (facilitated glucose	SLC2A5	Т
transporter), member 5		•
Solute carrier family 21, member 2	SLC21A2	Т
Coldia dallior latting = 1, 1110111001 &	~-~··	•

•		
Solute carrier family 21, member 3	SLC21A3	Т
Solute carrier family 22, member 5	SLC22A5	Т
Solute carrier family 3 (facilitated glucose	SLC3A1	Т
transporter), member 1		
Solute carrier family 4 (anion exchanger),	SLC4A1	Т
member 1		•
Solute carrier family 4 (anion exchanger),	SLC4A2	Т
member 2		•
Solute carrier family 4 (anion exchanger),	SLC4A3	Т
member 3		•
Solute carrier family 5 (sodium/glucose	SLC5A1	Т
transporter), member 1		•
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2		•
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5		•
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	T
AMINOBUTYRIC ACID transporter), member		•
1		
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3	0200710	•
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2	0200712	•
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		•
Solute carrier family 8 (sodium/calcium	SLC8A1	Т
exchanger), member 1		•
Sonic hedgehog, SHH	SHH	G
Sorcin	SRI	T
Spectrin alpha	SPTA1	s
Spectrin beta	SPTB	S
Sphingomyelinase	SMPD1	Ē
Stem cell factor	SCF	Ğ
Steroid 5 alpha reductase 1	SRD5A1	Ē
Steroid 5 alpha reductase 2	SRD5A2	Ē
Steroidogenic acute regulatory protein	STAR	T
Sterol carrier protein 2	SCP2	T,
Succinate dehydrogenase 1	SDH1	F
Succinate dehydrogenase 2	SDH2	E E
Succinate thiokinase	33.12	E
Superoxide dismutase 1	SOD1	Ē
Superoxide dismutase 3	SOD3	Ē
Surfeit 1	SURF1	Ğ
Synapsin 1a & 1b	SYN1	N
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle amine transporter	SVAT	N
Synaptobrevin 1	SYB1	N
	- · - ·	• •

Synaptobrevin 2	SYB2	N
Synaptogyrin	0.45	N
Synaptophysin	SYP	Ν
Synaptosomal-associated protein, 25KD	SNAP25	Ν
Synaptotagmin 1	SYT1	Ν
Synaptotagmin 2	SYT2	Ν
Syntaxin 1	STX1	Ν
Talin	TLN	G
T-BOX 1	TBX1	G
T-BOX 3	TBX3	G
TEK, tyrosine kinase, endothelial	TEK	Ε
Terminal deoxynucleotidyltransferase	TDT	1
Tetranectin	TNA	Т
Thiolase, perioxisomal		E
Thiopurine S-methyltransferase	TPMT	Ε
Thrombin receptor	F2R	1
Thrombomodulin	THBD	1
Thrombopoietin	THPO	G
Thrombospondin	THBS1	G
Thromboxane A synthase 1	TBXAS1	1
Thromboxane A2	TXA2	1
Thromboxane A2 receptor	TBXA2R	1
Thy-1 T-cell antigen	THY1	1
Thymic humoral factor	٠.	1
Thymopoietin	TMPO	G
Thymosin		1
Thyroid hormone receptor, alpha	THRA	G
Thyroid hormone receptor, beta	THRB	G
TIE receptor tyrosine kinase	TIE-1	G
Tip-associated protein	TAP	ı
Tissue inhibitor of metalloproteinase 1, TIMP1	TIMP1	Ε
Tissue inhibitor of metalloproteinase 2,	TIMP2	Ε
TIMP2		
Tissue inhibitor of metalloproteinase 3, TIMP3	TIMP3	Ε
Tissue inhibitor of metalloproteinase 4,	TIMP4	Ε
TIMP4		
Topoisomerase I		Ε
Torticollis, keloids, cryptorchidism and renal	TKCR	G
dysplasia gene		
Transcobalamin 2, TCN2	TCN2	T
Transcription factor 2, hepatic	TCF2	G
Transferrin	TF	G
Transferrin receptor	TFRC	G
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G

Translocation in renal carcinoma on	TRC8	G
chromosome 8 gene	•	
Transthyretin	TTR	T
Triosephosphate isomerase	TPI1	Ε
Tropomyosin 1 alpha	TPM1	S
Troponin C		S
Troponin I	TNN13	s
Troponin T2, cardiac	TNNT2	S
Tuberous sclerosis 1	TSC1	Ğ
Tuberous sclerosis 2	TSC2	· G
Tumour necrosis factor (TNF) receptor	TRAF1	Ī
associated factor 1		
Tumour necrosis factor (TNF) receptor	TRAF2	
associated factor 2		ı
Tumour necrosis factor (TNF) receptor	TRAF3	
associated factor 3	IIAES	i
Tumour necrosis factor (TNF) receptor	TRAF4	
associated factor 4	I TAP4	i
Tumour necrosis factor (TNF) receptor	TDACE	
associated factor 5	TRAF5	1
	TDATO	
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	l
	T1 1 = 1	
Tumour necrosis factor alpha	TNFA	1
Tumour necrosis factor alpha receptor	TNFAR	ı
Tumour necrosis factor beta	TNFB	1
Tumour necrosis factor beta receptor	TNFBR	1
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tyrosine hydroxylase	TH	Ε
Ubiquitin		G
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
UDP-glucose pyrophosphorylase		Ε
UDP-glucuronosyltransferase 1	ugt1d, UGT1	Е
UDP-glucuronosyltransferase 2	UGT2	Ē
Uncoupling protein 1		T
Uncoupling protein 3	UCP3	Ť
Undulin 1	COL14A1	S
Uridinediphosphate(UDP)-galactose-4-	GALE	Ë
epimerase		-
Uroporphyrinogen III synthase	UROS	E
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	
Vascular endothelial growth factor	VEGF	N
Vasoactive intestinal polypeptide	VEGF	G
Vasoactive intestinal polypeptide receptor		N
Vasoinhibitory peptide	VIPR	N
Vason motory peptide Vimentin	\ /1B.4	G
viiiGhuli .	VIM	t

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Vinculin		S
Vitamin D receptor	VDR	G
Von Hippel-Lindau gene	VHL	G
Von Willebrand factor	ÚWF	Ť
Werner syndrome helicase	WRN	G
Wiskott-Aldrich syndrome protein	WASP, THC	1
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	G
Wolfram syndrome 1 gene	WFS1	S
Xanthine dehydrogenase	XDH	E
Zinc finger protein 3	ZIC3	S

In a nineth aspect.

GASTROINTESTINAL

The present invention relates to a method of assessing the risk of developing clinical or social consequences of dysfunction, damage or disease of the gastrointestinal tract and indicating appropriate therapeutic interventions.

The gastrointestinal tract stores, digests and absorbs nutrients from foodstuffs and eliminates body wastes. The gastrointestinal tract comprises the mouth and salivary glands, oesophagus, stomach, small intestine, large intestine, colon and rectum. In addition the liver, pancreas, kidney, gall bladder and biliary tract also have major roles in the enabling and co-ordination of gastrointestinal function (Weatherall, Leadingham and Warrell 1996).

The regulation of gastrointestinal function is achieved by an extensive series of monitoring and feedback systems which include the intrinsic nerves of the enteric nervous system, vagal and sympathetic nerves, neuropeptides, hormones and transmitters. Together these diverse systems act to link the central nervous system and the components of the gastrointestinal tract in order to co-ordinate and control the processes regulating the absorption of nutrients and the elimination of wastes.

The digestive and absorptive process involved in obtaining nutrients from food stuff and the physical processes involved in the elimination of wastes have given rise to the specialised functions of gastrointestinal tissues. Nutrients in foodstuffs need to be solublised in order for them to be absorbed across the gut wall. Teeth, tongue and the acid environment of the stomach are important in liquidising semi-solid foodstuffs, thus allowing the breakdown of their constituent molecules into extractable nutrients. Because foodstuffs contain potential pathogens and toxins the gut wall must be capable of defending and repairing itself and the gastrointestinal tract must have a system for rendering harmless potential toxins (the liver). The physical processes involved in moving the liquidised foodstuffs through the gastrointestinal tract involve the integration of muscular activity (circular and longitudinal muscles) such that flow of foodstuffs and subsequent wastes is smooth and largely unidirectional through the system.

Dysfunction, damage or disease of the gastrointestinal tract is characterised by a relatively circumscribed range of symptoms including:

Dysphagia
Vomiting
Mouth, neck or abdominal pain
Diarrhoea
Constipation
Gastrointestinal bleeding
Nutritional disorders

The diverse nature of the component organs which make up the gastrointestinal tract is mirrored in the range of pathological mechanisms which underlie dysfunction,

damage and disease of the gastrointestinal tract. The syndromes and causes of dysfunction, damage and disease of the gastrointestinal system include:

Dental caries

Ulceration (e.g. mouth, gastric, intestinal)

Infection (e.g. herpes simplex, AIDS, helicobacter pylori, hepatitis, shigella)

Reflux disease

Smooth muscle disease (e.g. scleroderma)

Striated muscle disorders (e.g. inclusion body myositis)

Tumours

Malnutrition

Malabsorption (e.g. coeliac disease, Whipples disease)

Congenital abnormalities (e.g. oesophageal artresia, Caroli's syndrome)

Immune disorders (e.g. allergies, Crohn's disease, ulcerative colitis, irritable bowel syndrome)

Disorders of neuronal innervation (Hirschprung's disease)

Vascular and collagen disorders

Genetic disorders (e.g. haemochromatosis, galactosaemia, Niemann-Pick disease)

Bacterial overgrowth

Toxins/poisons

Drug use and abuse (e.g. Tacrine, Troglitazone, Paracetamol)

The range of pathology and thus the impact of such pathology on an individual's quality of life is very broad. A heavy meal can cause a brief episode of discomfort due to excess stomach acid and is easily remedied by taking an appropriate antidote, whereas tumour metastases affecting the liver compromise the de-toxification systems of the body and are a life threatening event. In addition, because the preferred route of administering drug therapy is by the oral route (thus exposing the gastrointestinal system to the drug and relying on absorption through the gut for entry into the body) the pharmacokinetics of many therapeutic interventions are altered by gastrointestinal functionality and associated with adverse events characterised by the symptoms of nausea, diarrhoea etc (Brody, Larner and Minneman 1998, British National Formulary 1998).

The physiology and control of the body's gastrointestinal system is extremely complex and involves the synergistic or inhibitory interaction between multiple regulatory pathways and molecular cascades. Variation in the functionality of the proteins involved in these processes will, inevitably, cause or have an impact on the functioning of these systems or an individuals attempts to minimise damage and restore function following dysfunction, damage or disease in these systems. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from dysfunction, damage or disease of the gastrointestinal tract including genetic history, age, sex, nutritional status, pre-existing disease or injury, drug treatments and socio-economic circumstances. Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to the occurrence of gastrointestinal pathology

and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at the heart of the difficulties experienced in the healthcare and social management of dysfunction, damage or disease of the gastrointestinal tract.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

GASTROINTESTINAL GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	E
17beta hydroxysteroid dehydrogenase 1	HSD17B1	Ε
17beta hydroxysteroid dehydrogenase 3	HSD17B3	Ε
17beta hydroxysteroid dehydrogenase 4	HSD17B4	E
17beta hydroxysteroid oxidoreductase		E
2,3-bisphosphoglycerate mutase	BPGM	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	E
6-phosphofructo-2-kinase	PFKFB1	E
Acetoacetyl 1-CoA-thiolase	ACAT1	E
Acetoacetyl 2-CoA-thiolase	ACAT2	E
Acetyl CoA carboxylase	ACC	E
Acetyl CoA carboxylase alpha	ACACA	Ε
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Acid phosphatase 2, lysosomal	ACP2	E
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Actin, beta	ACTB	S
Actin, gamma 2	ACTG2	S
Acyl CoA dehydrogenase, long chain	ACADL	E
Acyl CoA dehydrogenase, medium chain	ACADM	E
Acyl CoA dehydrogenase, short chain	ACADS	E
Acyl CoA dehydrogenase, very long chain	ACADVL	E
Acyl CoA synthetase, long chain, 1	LACS1	Ē
Acyl CoA synthetase, long chain, 2	LACS2	Ē
Acyl CoA synthetase, long chain, 4	ACS4	Ē

Acyl malonyl condensing enzyme Acyl-CoA thioesterase Adaptin, beta 3A Adenine phosphoribosyltransferase Adenomatous polyposis coli tumour supressor	ADTB3A APRT APC	EETT
gene	APC	G
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	N
Adenylate cyclase 1	ADCY1	E
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	E
Adenylate cyclase 4	ADCY4	Ē
Adenylate cyclase 5	ADCY5	Ē
Adenylate cyclase 6	ADCY6	E
Adenylate cyclase 7	ADCY7	E
Adenylate cyclase 8	ADCY8	Е
Adenylate cyclase 9	ADCY9	Ε
Adrenergic receptor, alpha1	ADRA1	Ν
Adrenergic receptor, alpha2	ADRA2	Ν
Adrenergic receptor, beta1	ADRB1	Ν
Adrenergic receptor, beta2	ADRB2	Ν
Adrenergic receptor, beta3	ADRB3	Ν
Adrenocorticotrophic hormone (ACTH)	ACTHR .	G
receptor		•
Alanine aminotransferase		T
Alanine-glyoxylate aminotransferase	AGXT	E
Albumin, ALB	ALB	T
Alcohol dehydrogenase 1	ADH1	E
Alcohol dehydrogenase 2	ADH2	Ε
Alcohol dehydrogenase 3	ADH3	E
Alcohol dehydrogenase 4	ADH4	E
Alcohol dehydrogenase 5	ADH5	E
Alcohol dehydrogenase 6 Alcohol dehydrogenase 7	ADH6	E
Aldehyde dehydrogenase 1	ADH7	E
Aldehyde dehydrogenase 2	ALDH1	E
Aldehyde dehydrogenase 5	ALDH5	E
Aldehyde dehydrogenase 6	ALDH6	E
Aldehyde dehydrogenase 7	ALDH7	E
Aldolase A	ALDOA	E
Aldolase B	ALDOB	Ē
Aldolase C	ALDOC	E
Aldose reductase	•	T
Aldosterone receptor	MLR	Ġ
Alkaline phosphatase, liver/bone/kidney	ALPL	Ť
Alpha 2 macroglobulin	A2M	i

alpha1-antitrypsin	Pl ·	Ε
alpha2-antiplasmin	PLI	E
alpha-actinin 2	ACTN2	G
alpha-actinin 3	ACTN3	G
alpha-amylase	A01145	
alpha-dextrinase		E
alpha-Galactosidase A	GLA	E
alpha-ketoglutarate dehydrogenase	GLA	E
alpha-L-Iduronidase	IDUA	E
Aminomethyltransferase	AMT	E
Aminopeptidase P		E
Amphiregulin	XPNPEP2	Ε
· ·	AREG	G
Amylo-1,6-glucosidase	AGL	Ε
Angiopoletin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	E
Angiotensin receptor 1	AGTR1	T
Angiotensin receptor 2	AGTR2	T
Angiotensinogen	AGT	Ε
Antidiuretic hormone receptor	ADHR	Т
Antithrombin III	AT3	E
AP-2, alpha	TFAP2A	G
AP-2, beta	TFAP2B	G
AP-2, gamma	TFAP2C	G
Apolipoprotein A I	APOA1	Т
Apolipoprotein A II	APOA2	T
Apolipoprotein B	APOB	Т
Apolipoprotein C1	APOC1	Т
Apolipoprotein C2	APOC2	Т
Apolipoprotein C3	APOC3	Т
Apolipoprotein D	APOD	T
Apolipoprotein E	APOE	T
Apolipoprotein H	APOH	T
Aquaporin 1	AQP1	Ť
Aquaporin 2	AQP2	Ť
Arginine vasopressin	AVP	N
Arginine vasopressin receptor 1A	AVPR1A	N
Arginine vasopressin receptor 1B	AVPR1B	N
Arginine vasopressin receptor 2	AVPR2	N
Arginosuccinate lyase	ASL	E
Arginosuccinate synthetase	ASS	E
Aryl hydrocarbon receptor nuclear translocator		T
Arylsulfatase A	ARSA	Ė
Arylsulfatase B	ARSB	
Aspartate transaminase	, OD	E
Aspartylglucosaminidase	AGA	T
Ataxia telangiectasia gene, AT	ATM	E
ATP/ADP translocase	△ I IVI	G
THE TRANSPORT		E

Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	Ğ
Atrial natriuretic peptide receptor B	NPR2	Ğ
Atrial natriuretic peptide receptor C	NPR3	Ğ
Autoimmune regulator, AIRE	AIRE	Ī
Azoospermia factor 1	AZF1	G
beta 2 microglobulin	B2M	ĭ
beta-galactosidase	GLB1	Ė
beta-glucosidase, neutral		Ē
beta-Glucuronidase	GUSB	Ē
beta-ketoacyl reductase		E
Bile acid coenzyme A: amino acid N-	BAAT	Ē
acyltransferase		_
Bile salt export pump	BSEP, PFIC2	Т
Bile salt-stimulated lipase	CEL	Ė
Bilirubin UDP-glucuronosyltransferase	722	E
Biliverdin reductase		T
Bradykinin receptor B1		i
Bradykinin receptor B2		i
Branched chain keto acid dehydrogenase E1,	BCKDHA	Ė
alpha polypeptide	· ·	-
Branched chain keto acid dehydrogenase E1,	BCKDHB	Ε
beta polypeptide		_
Brush border guanylyl cyclase		Ε
Ca(2+) transporting ATPase, fast twitch	ATP2A1	Ŧ
Ca(2+) transporting ATPase, slow twitch	ATP2A2	Ť
Cadherin E	CDH1	Ġ
Cadherin EP		Ğ
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calcitonin/Calcitonin gene-related peptide	CALCA	N
alpha		•
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	N
subunit		•
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		•
Calcium channel, voltage-dependent, Alpha-	CACNA1C	N
1C		
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N
1D		' '
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)	0,1010,112	•
Calcium channel, voltage-dependent, Alpha-	CACNA2	N
2/delta	0/10/1/12	•
Calcium channel, voltage-dependent, Beta 1	CACNB1	N
Calcium channel, voltage-dependent, Beta 3	CACNB3	N
• • • • • • • • • • • • • • • • • • • •	CACNG2	N
Neuronal, Gamma	U. (U.)	14
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Calcium channel, voltage-dependent, T-type Calcium sensing receptor Calmodulin 1 Calmodulin 2 Calmodulin 3 Calmodulin dependant kinase Calmodulin-dependant protein kinase II Calnexin Canalicular multispecific organic anion	CASR CALM1 CALM2 CALM3 CAMK2A CANX CMOAT	NTGGGTGG
transporter	CIVIOAT	Т
Carbamoylphosphate synthetase 1 Carbamoylphosphate synthetase 2 Carbonic anhydrase 3 Carbonic anhydrase 4 Carbonic anhydrase, alpha Carbonic anhydrase, beta Carboxylesterase 1 Carboxypeptidase Carnitine acylcarnitine translocase Carnitine palmitoyltransferase I Carnitine palmitoyltransferase II Carnitine transporter protein Cartilage-hair hypoplasia gene Catalase Cathepsin B	CPS1 CPS2 CA3 CA4 CA1 CA2 CES1 CPN CACT CPT1A CPT2 CDSP, SCD CHH CAT	
Cathepsin E		E
Cathepsin G	CTSG	E
Cathepsin H		E
Cathepsin K	CTSK	E
Cathepsin L		E
Cathepsin S		Ε
CD1	CD1	ı
CD4	CD4	1
Cell adhesion molecule, intercellular, ICAM	ICAM1	G
Cell adhesion molecule, leukocyte-endothelial,	LECAM1	G
LECAM (CD62)	,	
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120 Cell adhesion molecule, neural, NCAM2	NCAM120	G
Cell adhesion molecule, neural, NCAM2 Cell adhesion molecule, platelet-endothelial.	NCAM2	G
PECAM	PECAM1	G
Cell adhesion molecule, vascular, VCAM	VCAM1	_
c-erbB2	ERBB2	G G
c-erbB3	ERBB3	G
c-erbB4	ERBB4	G
Ceruloplasmin precursor	CP	E
· ·		

Chemokine receptor CCR2	CCR2	١
Chemokine receptor CCR3	CCR3	1
Chemokine receptor CCR5	CCR5	i
Chemokine receptor CXCR4	CXCR4	i
Chitotriosidase	chit	Ė
Chloride channel 5	CLCN5	s
Chloride channel KB	CLCNKB	s
Cholecystokinin	CCK	N
Cholecystokinin B receptor	CCKBR	N
Cholestasis, progressive familial intrahepatic 1		G
gene	1101	G
Cholesterol ester hydroxylase		Е
Choline acetyltransferase	CHAT	E
Chromogranin A	CHGA	G
Chymotrypsinogen	CHGA	E
Citrate synthase		E
Clathrin		T
Clusterin	CLU	
CoA transferase	CEO	G
Cockayne syndrome gene, CKN1	CKN1	E
Collagen I alpha 1	COL1A1	G
Collagen I alpha 2		S
Collagen II alpha 1	COL1A2	S
	COL2A1	S
Collagen IV slabs 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S S
Collagen IV slobe 2	COL4A2	S
Collagen IV slahe 4	COL4A3	S S
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	S
Collagen IV alpha 6	COL4A6	S
Collagen IX alpha 2	COL9A2, EDM2	S
Collagen IX alpha 3	COL9A3	S
Collagen receptor	COLR	S
Collagen V alpha 1		S
Collagen V alpha 2		S
Collagen VI alpha 1	COL6A1	S
Collagen VI alpha 2		S
		S.
		S
Collagen X alpha 1	COL10A1	S
Collagen X alpha 1	COL11A1	S
Collagen XI alpha 2		S
	COL17A1	S
	CSF1	G
	C1NH	1
Complex I		Ε
Complex II		Ε
Complex III		Ε

Corticotrophin-releasing hormone Corticotrophin-releasing hormone receptor C-reactive protein CRP Creb binding protein Cu2+ transporting ATPase beta polypeptide Cubilin Cyclic AMP-dependent protein kinase Cyclic nucleotide phosphodiesterase 1B Cyclic nucleotide phosphodiesterase 1B1 Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4C Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclin f Cyclin-dependent kinase 2 Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CRH CRHR1 CREBBP ATP7B CUBN PKA PDE1B PDE1B1 PDE2A3 PDE3A PDE3A PDE3B PDE4A PDE4C PDE5A PDE6A PDE6B PDE7 PDE8 PDE9A CCNF CDK2 CDKN1C	TT - GHTHHHHHHHHHHHHHHGGGG
Cyclooxygenase 1 Cyclooxygenase 2 CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP21 CYP24 CYP27 CYP27B1 CYP27B1 CYP2A1 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7	COX1 COX2 CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A1 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7	
CYP2B6 CYP2C18 CYP2C19 CYP2C8 CYP2C9	CYP2B6 CYP2C18 CYP2C19 CYP2C8 CYP2C9	

CYP2D6	CYP2D6	Ε
CYP2E1	CYP2E1	Ē
CYP2F1		
	CYP2F1	E
CYP2J2	CYP2J2	Ε
CYP3A3	CYP3A3	Ε
CYP3A4	CYP3A4	Ε
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	=
CYP4A11	CYP4A11	E
	=	_
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	E
CYP4F3	CYP4F3	Ε
CYP51	CYP51	Ε
CYP5A1	CYP5A1	Ε
CYP7A	CYP7A	E
CYP8	CYP8	E
Cystathionase	CTH	E
Cystathione beta synthase	CBS	Ε
Cysteine-rich intestinal protein		T
Cystic fibrosis transmembrane conductance	CFTR	Ν
regulator, CFTR		
Cystinosin	CTNS	Т
Cytidine deaminase	CDA	Ė
Cytidine-5-prime-triphosphate synthetase	CTPS	Ē
Cytochrome a	0113	E
•		
Cytochrome c		E
Cytochrome c oxidase, MTCO		Ε
Cytokine-suppressive antiinflammatory drug-	CSBP1	ı
binding protein 1	•	
Cytokine-suppressive antiinflammatory drug-	CSBP2	1
binding protein 2		
DAX1 nuclear receptor	DAX1	ı
Deleted in colorectal carcinoma	DCC	_
		G
Delta aminolevulinate dehydratase	ALAD	E
Delta(4)-3-oxosteroid 5-beta-reductase		Ε
Delta-7-dehydrocholesterol reductase	DHCR7	Ē
Dihydrodiol dehydrogenase 1	DDH1	Ε
Dihydrolipoamide branched chain transacylase	DBT	Ν
Dihydrolipoamide dehydrogenase	DLD	N
DNA glycosylases		Ε
Dopamine beta hydroxylase	DBH	E
· · ·		
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	Ν
Dopamine receptors D5	DRD5	Ν
Dynamin	DNM1	G
Dynein		Ğ
- <i>,</i>)

Dystrophia myotonica Dystrophia myotonica, atypical Dystrophin EB1 Elastase 1 Elastase 2 Electron-transfering-flavoprotein alpha Electron-transferring flavoprotein beta Electron-transferring flavoprotein dehydrogenase	DM, DMPK DM2 DMD ELAS1 ELAS2 ETFA ETFB ETFDH	E S G E E T T E
Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Enolase Enoyl CoA isomerase Enoyl CoA reductase Enteric lipase	EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB ENO1	N N N N E E E T
Enterokinase Ephrin receptor tyrosine kinase A Ephrin receptor tyrosine kinase B Epidermal growth factor Epidermal growth factor receptor Erythrocyte membrane protein band 4.1 Erythropoietin Excision repair complementation group 2 protein	PRSS7, ENTK EPHA EPHB EGF EGFR EPB41 EPO ERCC2	- E G G G G S I E
Excision repair complementation group 2	ERCC3	Е
protein Eyes absent 1 Faciogenital dysplasia Factor 1 (No. one) Factor B, properdin Factor D	EYA1 FGD1, FGDY F1	G T !
Factor H Factor I (letter I) Factor III Factor IX Factor V Factor VII Factor VIII Factor X Factor XI Factor XII Factor XIII A & B FADH dehydrogenase	HF1 IF F3 F9 F5 F7 F8 F10 F11 F12 F13A & F13B	

Fanconi anemia, complementation group A Fanconi anemia, complementation group C Fanconi anemia, complementation group D Fatty acid binding proteins FABP1 Fatty acid binding proteins FABP2 Fatty acid binding proteins FABP3 Fatty acid binding proteins FABP4 Fatty acid binding proteins FABP5 Fatty acid binding proteins FABP6 Ferritin, H subunit	FANCA FANCC FANCD FABP2	T T T T T T T T T T T T T T T T T T T
Ferritin, L subunit	FTL	†
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
Flavin-containing monooxygenase 1	FMO1	E
Flavin-containing monooxygenase 2	FMO2	Ε
Flavin-containing monooxygenase 3	FMO3	E
Flavin-containing monooxygenase 4	FMO4	E
Folic acid receptor	FOLR ODG4	G
Follicle stimulating hormone receptor	FSHR, ODG1 FSHB	G
Follicle stimulating hormone, FSH Forkhead transcription factor 10	FKHL10	G G
Forkhead transcription factor 14	FKHL14	G
Fragile site, folic acid type, rare, fra(X) A	FRAXA	N
Fructose-1,6-diphosphatase	FBP1	E
Fucosidase alpha-L-1	FUCA1	E
Fucosidase alpha-L-2		E
Fucosyltransferase 2	FUT2	T
Fucosyltransferase 3	FUT3	Ť
Fumarase	FH	E
G/T mismatch binding protein	GTBP, MSH6	G
Galactocerebrosidase	GALC	Ε
Galactose 1-phosphate uridyl-transferase	GALT	Е
Galactosyltransferase 1	GT1	G
Galactosyltransferase, alpha 1,3	GGTA1	G
Galactosyltransferase, beta 3	B3GALT "	G···
Galanin	GAL	N
Galanin receptor	GALNR1	N
Gamma-glutamyltransferase 1	GGT1	T
Gamma-glutamyltransferase 2	GGT2	T
Gap junction protein beta 1	GJB1	Т
Gastric inhibitory polypeptide GIP	GIP	T
Gastric inhibitory polypeptide receptor, GIPR	GIPR	T
Gastric Intrinsic factor, GIF	GIF	E
Gastric lipase, LIPF	CAS	T
Gastrin	GAS	G

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Gastrin releasing peptide	GRP		Т
Gastrin releasing peptide receptor	GRPR		Т
Glial-cell derived neurotrophic factor (GDNF)			Ν
receptor			
Glial-cell derived neurotrophic factor, GDNF	GDNF		Ν
Glucagon receptor	GCGR		G
Glucagon synthase	2		T
Glucagon-like peptide receptor 1	GLP1R		G
Glucokinase	GCK		Ε
Glucose-6-phosphatase	G6PC		Ε
Glucose-6-phosphatase translocase	G6PT1	V 14.	
Glucose-6-phosphate dehydrogenase	G6PD		Ε
Glucosidase, acid alpha	GAA		Ε
Glutamate dehydrogenase	GLUD1		Ε
Glutamine synthase			Ε
Glutamine transporter			T
Glutathione	GSH		T
Glutathione peroxidase, GPX2	GPX2		Ε
Glutathione S-transferase, GSTZ1	GSTZ1		Ε
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH		Ε
GAPDH			
Glycerol kinase	GK		Ε
Glycinamide ribonucleotide (GAR)	GART		Ε
transformylase			
Glycine dehydrogenase	GLDC		Ε
Glycogen branching enzyme	GBE1		Ε
Glycogen phosphorylase	PYGL		Ε
Glycogen synthase 1 (muscle)	GLYS1		Ε
Glycogen synthase 2 (liver)	GYS2		Ε
Glycosyltransferases, ABO blood group	ABO		Ε
Gonadotropin releasing hormone	GNRH		G
Goosecoid GSC			G
Growth arrest-specific homeobox	GAX		G
Growth hormone receptor	GHR		G
Guanylin	GUCA2		T
H(+), K(+) - ATPase	ATP4B		Ν
Haem oxygenase			Т
Haemoglobin alpha 1	HBA1	# 1 k %	Т
Haemoglobin alpha 2	HBA2		Т
Haemoglobin beta	HBB		T
Haemoglobin delta	HBD		T
Haemoglobin gamma A	HBG1		Т
Haemoglobin gamma B	HBG2		Т
Haemoglobin gamma G	HBGG		T
Heat shock protein, HSP60			1
Heat shock protein, HSP70			İ
Heat shock protein, HSP90			1
Heat shock protein, HSPA1			1

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Heat shock protein, HSPA2		i
Heparan sulfamidase	·	Ε
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	- 1
Hepatic nuclear factor-3-beta	HNF3B	E
Hepatic nuclear factor-4-alpha	HNF4A	Ε
Hepatitis B virus integration site 1	HVBS1	1
Hepatitis B virus integration site 2	HVBS6	
Hepatocyte growth factor	HGF	G
Hermanský-pudlak syndrome gene	HPS	T
Hexokinase 1	HK1	Ε
Hexokinase 2 Hexosaminidase A	HK2	E
Hexosaminidase B	HEXA,TSD HEXB	E E
Histamine receptors, H1	nexb	N
Histamine receptors, H2		N
Histamine receptors, H3		N
Histatin 1		1
Histatin 2		i
Histatin 3	HTN3	i
HLA-B associated transcript 1	BAT1	i
HMG-CoA lyase	HMGCL	E
HMG-CoA reductase	HMGCR	Е
HMG-CoA synthase	HMGCS2	E
Holocarboxylase synthetase	HLCS	Ε
Hormone-sensitive lipase	HSL	Ε
Hydroxyacyl glutathione hydrolase	HAGH	Ε
Hypoxanthine-guanine	HPRT	Ε
phosphoribosyltransferase, HGPRT		
IC7 A and B	100	
Iduronate 2 sulphatase	IDS	E
Immunoglobulin E (IgE) reponsiveness gene Immunoglobulin E (IgE) serum concentration	IGER IGES	
regulator gene	IGES	,
Immunoglobulin gamma (IgG) 2	IGHG2	1
Immunoglobulin heavy mu chain	IGHM	i
Immunoglobulin J polypeptide	IGJ	i
Immunoglobulin kappa constant region	IGKC ·	-1 -
Immunoglobulin kappa variable region	IGKV	ı
Inhibin, alpha	INHA	G
Inhibin, beta A	INHBA	G
Inhibin, beta B	INHBB	G
Inhibin, beta C	INHBC	G
Inositol 1,4,5-triphosphate receptor 3	ITPR3	G
Insulin	INS	G
Insulin receptor	INSR	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G

Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 3	ITGB3	Ğ
Integrin beta 6	ITGB6	G
Integrin, alpha M	ITGAM	G
Integrin, alpha X	ITGAX	
Inter-alpha-trypsin inhibitor, IATI	IIGAX	G
Inter-alpha-trypsin infibitor, IATT	ITNIA 4	E
Interferon beta	IFNA1	
	IFNB	- 1
Interferon gamma	IFNG	ı
Interferon gamma receptor 1	IFNGR1	ı
Interferon gamma receptor 2	IFNGR2	- 1
Interferon regulatory factor 1	IRF1	- 1
Interferon regulatory factor 4	IRF4	-
Interleukin(IL) 1 receptor	IL1R	ı
Interleukin(IL) 1, alpha	IL1A	1
Interleukin(IL) 1, beta	IL1B	1
Interleukin(IL) 10	IL10	1
Interleukin(IL) 10 receptor	IL10R	1
Interleukin(IL) 11	IL11	i
Interleukin(IL) 11 receptor	IL11R	i
Interleukin(IL) 12	IL12	i
Interleukin(IL) 12 receptor, beta 1	IL12RB1	i
Interleukin(IL) 13	IL13	i
Interleukin(IL) 13 receptor	IL13R	i
Interleukin(IL) 2	IL2	i
Interleukin(IL) 2 receptor, alpha	IL2RA	1
Interleukin(IL) 2 receptor, gamma	IL2RG	ı
Interleukin(IL) 3	IL3	-
Interleukin(IL) 3 receptor	IL3R	-
Interleukin(IL) 4	IL4	1
Interleukin(IL) 4 receptor	IL4R	1
· · · · · · · · · · · · · · · · · · ·		1
Interleukin(IL) 5	IL5	!
Interleukin(IL) 5 receptor	IL5R	1
Interleukin(IL) 6	IL6	1
Interleukin(IL) 6 receptor	IL6R	ı
Interleukin(IL) 7	IL7	ı
Interleukin(IL) 7 receptor	IL7R	1
Interleukin(IL) 8	IL8	1
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	1
Intestinal alkaline phosphatase IAP		Ť
Islet amyloid polypeptide	IAPP	N
Isocitrate dehydrogenase		E
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Lactase Laminin 5, alpha 3 Laminin 5, beta 3 Laminin 5, beta 3 Laminin 5, gamma 2 LAMC2 Laminin M Laminin receptor 1 Latent transforming growth factor-beta binding protein 2 Lecithin-cholesterol acyltransferase Lecithin-cholesterol acyltransferase Leptin Leptin Leptin Leptin Leptin Leukocyte-specific transcript 1 Leukotriene A4 hydrolase Leukotriene A4 hydrolase Leukotriene B4 receptor Leukotriene B4 receptor Leukotriene B4 synthase LTA4S ELeukotriene C4 receptor Leukotriene C4 receptor LiM homeobox protein 1 LIM homeobox protein 1 LHX1 LiM homeobox transcription factor 1, beta Lipoparnide dehydrogenase OGDH Lipoprotein lipase Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 3 Lipoprotein, Low Density 3 Lipoprotein, Low Density 4 Lipoprotein, Low Density 5 Lipoprotein, Low Density 6 Lipoprotein, Low Density 6 Lipoprotein, Low Density 7 Lipoprotein, Low Density 9 Lipoprotein, Low Density 1 Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density 6 Lipoprotein, Low Density 6 Lipoprotein, Low Density 6 Lipoprotein, Low Density 6 Lipoprotein, Low Density 7 Lipoprotein, Low Density 9 L	Isovaleric acid CoA dehydrogenase Kallikrein 3 Kallman syndrome gene 1 Ketohexokinase ketolase Kininogen, High molecular weight Kynurenine hydroxylase Kynureninease	IVD KAK3 KAL1 KHK KNG	M-0MM-MM
Laminin 5, beta 3 Laminin 5, gamma 2 Laminin 5, gamma 2 Laminin M Laminin G Laminin M Laminin receptor 1 Latent transforming growth factor-beta binding Latent transforming growth factor-beta binding Latent transforming growth factor-beta binding LTBP2 Grotein 2 Lecithin-cholesterol acyltransferase LCAT Leptin LEP G Leptin CEPR G LEPR G LEPR G LEPR G LEVACTICER LEPR G LEVACTICER LEF-1 LIPACTICER LIPACTICER LEF-1 LIPACTICER LEF-1 LIPACTICER LEF-2 LIPACTICER LEF-2 LIPACTICER LEF-2 LIPACTICER LEF-2 LIPACTICER LEF-2 LIPACTICER LEF-2 LIPACTICER MADS box transcription-enhancer factor 2A MEF2A MADS box transcription-enhancer factor 2B MEF2B MADS box transcription-enhancer factor 2C MEF2C MADS box transcription-enhancer factor 2C MEF2C MADS box transcription-enhancer factor 2C MEF2C		LAMA3	
Laminin 5, gamma 2 Laminin M Laminin receptor 1 Latent transforming growth factor-beta binding protein 2 Lecithin-cholesterol acyltransferase Lecithin-cholesterol acyltransferase Leptin Leptin Leptin Leptin Leptin Leptin Leukocyte-specific transcript 1 Leukotriene A4 hydrolase Leukotriene A4 synthase Leukotriene B4 receptor Leukotriene B4 receptor Leukotriene B4 synthase Leukotriene C4 receptor Leukotriene C4 synthase Leukotriene C4 synthase LTC4S E Leukotriene D4/E4 receptor LIM homeobox protein 1 LIM homeobox transcription factor 1, beta Lipoprotein lipase LPL Lipoprotein, ligh Density Lipoprotein, ligh Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Very Low Density 2 Lipoprotein, Very Low Density Cappensor Lymphoid enhancer-binding factor Lysosomal acid lipase Lyz LMAD (mothers against decapentaplegic, MADH4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2C MADS box transcription-enhancer factor 2C MEF2C MADS box transcription-enhancer factor 2C MEF2C MADS box transcription-enhancer factor 2C MEF2C MADS box transcription-enhancer factor 2C MEF2C MADS box transcription-enhancer factor 2C MEF2C MEP2 MADS box transcription-enhancer factor 2C MEF2C MEP2 MADS box transcription-enhancer factor 2C MEF2C	· · · · · · · · · · · · · · · · · · ·		
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Leptin LEPR G Leptin receptor LEPR G Leukocyte-specific transcript 1 LST-1 Leukotriene A4 hydrolase LTA4S Leukotriene B4 receptor Leukotriene B4 receptor Leukotriene C4 receptor Leukotriene C4 receptor Leukotriene D4/E4 receptor Leukotriene D4/E4 receptor LIM homeobox protein 1 LHX1 LIM homeobox transcription factor 1, beta LMX1B Lipoprotein lipase LPL Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, Low Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Very Low Density Low density lipoprotein receptor-related protein LRP Trecursor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lysosomal acid lipase Lyz MAD (mothers against decapentaplegic, MADH4 Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A MADS box transcription-enhancer factor 2C MEF2C MEF2C MEF2C MEF2C MEF2C MEF2C MEF2C MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C G MEF2C MEF	•	I CAT	=
Leptin receptor Leukocyte-specific transcript 1 Leukotriene A4 hydrolase Leukotriene A4 synthase Leukotriene B4 receptor Leukotriene B4 synthase LTB4S ELeukotriene B4 synthase LTB4S ELeukotriene C4 receptor Leukotriene C4 receptor Leukotriene C4 synthase LTC4S ELeukotriene D4/E4 receptor LIM homeobox protein 1 LHX1 LIM homeobox transcription factor 1, beta Lipoprotein lipase Lipoprotein lipase Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, Low Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Low Density VLDLR Tow density lipoprotein receptor-related protein LRP Tercursor Lymphoid enhancer-binding factor LEF-1 Lysosomal acid lipase LIPA ELysozyme LYZ MAD (mothers against decapentaplegic, MADH4 Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2C MEF2C G MADS box transcription-enhancer factor 2C MEF2C G MADS box transcription-enhancer factor 2C MEF2C	•		
Leukocyte-specific transcript 1 LST-1 I Leukotriene A4 hydrolase I Leukotriene A4 synthase LTA4S E Leukotriene B4 receptor I Leukotriene B4 synthase LTB4S E Leukotriene C4 receptor I Leukotriene C4 synthase LTC4S E Leukotriene D4/E4 receptor I LEUKOTRIENE D4/E4 receptor I LIM homeobox protein 1 LHX1 G LIM homeobox transcription factor 1, beta LMX1B G Lipoamide dehydrogenase OGDH E Lipoprotein lipase LPL I Lipoprotein receptor, Low Density LDLR T Lipoprotein, High Density HDLDT1 T Lipoprotein, Low Density LDLR T Lipoprotein, Low Density I Lipoprotein, Low Density 1 T Lipoprotein, Low Density 2 T Lipoprotein, Very Low Density VLDLR T Low density lipoprotein receptor-related protein LRP T Lysosomal acid lipase LIPA E Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 G Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	•		
Leukotriene A4 hydrolase Leukotriene A4 synthase Leukotriene B4 receptor Leukotriene B4 synthase Leukotriene B4 synthase Leukotriene C4 receptor Leukotriene C4 synthase Leukotriene D4/E4 receptor Leukotriene D4/E4 receptor LIM homeobox protein 1 LIM homeobox transcription factor 1, beta Lipoprotein lipase Lipoprotein lipase LPL Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, High Density Lipoprotein, Low Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Very Low Density VLDLR Tow density lipoprotein receptor-related protein LRP Terecursor Lymphoid enhancer-binding factor Lysosomal acid lipase Lyz IMAD (mothers against decapentaplegic, MADH4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2C MADS box transcription-enhancer factor 2C MEF2C MESAS LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTA4S E LTC4S E LHX1 G CTAX1 G T LEF-1 G LYZ I G MADH4 G G MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C	•		ī
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Leukotriene C4 synthase Leukotriene D4/E4 receptor LIM homeobox protein 1 LIM homeobox transcription factor 1, beta Lipoamide dehydrogenase Lipoprotein lipase Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, High Density Lipoprotein, Low Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Low Density 2 Lipoprotein, Very Low Density VLDLR Tow density lipoprotein receptor-related protein LRP Toprecursor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lyz IMAD (mothers against decapentaplegic, MADH4 GDrosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2C G MADS box transcription-enhancer factor 2C MEF2C		LTB4S	Ε
Leukotriene D4/E4 receptor LIM homeobox protein 1 LIM homeobox transcription factor 1, beta LIM homeobox transcription factor 1, beta Lipoamide dehydrogenase Cipoamide dehydrogenase Cipoprotein lipase Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, Intermediate Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Very Low Density VLDLR T Low density lipoprotein receptor-related protein LRP T precursor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lyz I MAD (mothers against decapentaplegic, MADH4 G Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A MADS box transcription-enhancer factor 2B MEF2B MADS box transcription-enhancer factor 2C MEF2C G MADS box transcription-enhancer factor 2C MEF2C			-
LIM homeobox protein 1 LHX1 G LIM homeobox transcription factor 1, beta LMX1B G Lipoamide dehydrogenase OGDH E Lipoprotein lipase LPL I Lipoprotein receptor, Low Density LDLR T Lipoprotein, High Density HDLDT1 T Lipoprotein, Intermediate Density T Lipoprotein, Low Density 1 T Lipoprotein, Low Density 2 T Lipoprotein, Very Low Density VLDLR T Low density lipoprotein receptor-related protein LRP T precursor Lymphoid enhancer-binding factor LEF-1 G Lysosomal acid lipase LIPA E Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 G Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	•	LTC4S	
LIM homeobox transcription factor 1, beta LMX1B G Lipoamide dehydrogenase OGDH E Lipoprotein lipase LPL I Lipoprotein receptor, Low Density LDLR T Lipoprotein, High Density HDLDT1 T Lipoprotein, Intermediate Density T Lipoprotein, Low Density 1 T Lipoprotein, Low Density 2 T Lipoprotein, Low Density 2 T Lipoprotein, Very Low Density VLDLR T Low density lipoprotein receptor-related protein LRP T precursor Lymphoid enhancer-binding factor LEF-1 G Lysosomal acid lipase LIPA E Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 G Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2C MEF2C G	· · · · · · · · · · · · · · · · · · ·	1.1.124	
Lipoamide dehydrogenase Lipoprotein lipase Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, Intermediate Density Lipoprotein, Low Density Lipoprotein, Low Density Lipoprotein, Low Density Lipoprotein, Low Density Lipoprotein, Low Density Lipoprotein, Very Low Density VLDLR T Low density lipoprotein receptor-related protein LRP T precursor Lymphoid enhancer-binding factor Lysosomal acid lipase LIPA E Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 G Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2C G	•		
Lipoprotein lipase LDLR T Lipoprotein receptor, Low Density LDLR T Lipoprotein, High Density HDLDT1 T Lipoprotein, Intermediate Density T Lipoprotein, Low Density 1 T Lipoprotein, Low Density 2 T Lipoprotein, Very Low Density VLDLR T Low density lipoprotein receptor-related protein LRP T precursor Lymphoid enhancer-binding factor LEF-1 G Lysosomal acid lipase LIPA E Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 G Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	·		
Lipoprotein receptor, Low Density Lipoprotein, High Density Lipoprotein, Intermediate Density Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Very Low Density Lipoprotein, Very Low Density Low density lipoprotein receptor-related protein LRP Toprecursor Lymphoid enhancer-binding factor Lysosomal acid lipase LIPA ELysozyme LYZ IMAD (mothers against decapentaplegic, MADH4 GOrosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2B GMADS box transcription-enhancer factor 2C MEF2C	· · · · · · · · · · · · · · · · · · ·		
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Lipoprotein, Low Density 1 Lipoprotein, Low Density 2 Lipoprotein, Very Low Density VLDLR T Low density lipoprotein receptor-related protein LRP T precursor Lymphoid enhancer-binding factor Lymphoid enhancer-binding factor Lysosomal acid lipase LIPA E Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2B G MADS box transcription-enhancer factor 2C	, ,	1100011	
Lipoprotein, Low Density 2 Lipoprotein, Very Low Density VLDLR T Low density lipoprotein receptor-related protein LRP T precursor Lymphoid enhancer-binding factor Lysosomal acid lipase LIPA E Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2B G MADS box transcription-enhancer factor 2C		,	_
Lipoprotein, Very Low Density Low density lipoprotein receptor-related protein LRP T precursor Lymphoid enhancer-binding factor Lysosomal acid lipase Lyz Lyz I MAD (mothers against decapentaplegic, MADH4 Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	• •		
Low density lipoprotein receptor-related protein LRP precursor Lymphoid enhancer-binding factor Lysosomal acid lipase Lysozyme Lyz I MAD (mothers against decapentaplegic, MADH4 Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	• •	VLDLR	T
Lymphoid enhancer-binding factor Lysosomal acid lipase Lysozyme LYZ I MAD (mothers against decapentaplegic, Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2B G MADS box transcription-enhancer factor 2C		LRP "	T
Lysosomal acid lipase Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MADS box transcription-enhancer factor 2B MADS box transcription-enhancer factor 2C MEF2B G MADS box transcription-enhancer factor 2C	precursor		
Lysozyme LYZ I MAD (mothers against decapentaplegic, MADH4 G Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	Lymphoid enhancer-binding factor	LEF-1	
MAD (mothers against decapentaplegic, MADH4 G Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	Lysosomal acid lipase		Ε
Drosophila) homologue 4 MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C G			1
MADS box transcription-enhancer factor 2A MEF2A G MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	•	MADH4	G
MADS box transcription-enhancer factor 2B MEF2B G MADS box transcription-enhancer factor 2C MEF2C G	• •	METOA	_
MADS box transcription-enhancer factor 2C MEF2C G	·		
·	· · · · · · · · · · · · · · · · · · ·		
	·		

Malamid O. A. L. Johnson		
Malonyl CoA decarboxylase	•	Ε
Malonyl CoA transferase		Ε
Maltase-glucoamylase		E
Mannosidase, alpha B lysosomal	MANB	E
Marenostrin	MEFV	T
MAX-interacting protein 1	MXI1	G
MEK kinase, MEKK		Ε
Melanocortin 2 receptor	MC2R	Т
Melanocortin 4 receptor	MC4R	Т
Menin	MEN1	G
Metallothionein	·	T
Mevalonate kinase	MVK	E
MHC Class I: A		ı
MHC Class I: B		ı
MHC Class I: C		1
MHC Class I: LMP-2, LMP-7		I
MHC Class I: Tap1	ABCR, TAP1	ı
MHC Class II: DP	HLA-DPB1	ı
MHC Class II: DQ	·	1
MHC Class II: DR		I
MHC Class II: Tap2	TAP2, PSF2	I
MHC Class II:Complementation group A	MHC2TA	1
MHC Class II:Complementation group B	rfxank	F
MHC Class II:Complementation group C	RFX5	ı
MHC Class II:Complementation group D	RFXAP	1
Microsomal triglyceride transfer protein	MTP	T
Mitochondrial trifunctional protein, alpha	HADHA	Е
subunit		
Mitochondrial trifunctional protein, beta subunit		Ε
Molybdenum cofactor synthesis 1	MOCS1 .	Ε
Molybdenum cofactor synthesis 2	MOCS2	Ε
Monoamine oxidase A	MAOA	Ε
Monoamine oxidase B	MAOB	Ε
Motilin	MLN	G
Msh homeobox homolog 2	MSX2	G
Mucin 18	MUC18	T
Mucin, MUC2		T
Mucin, MUC5AC	and the second of the second o	Т
Mucin, MUC6		Т
Mucolipidoses	GNPTA	E
Mulibrey nanism	MUL	Т
Muscarinic receptor, M1	CHRM1	Ν
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	Ν
Muscarinic receptor, M5	CHRM5	N
Muscle phosphorylase	PYGM	Ε
Mutated in colorectal cancers, MCC	MCC	G

MutL homolog 1	MLH1	G
MutS homolog 2	MSH2	G
MutS homolog 3	MSH3	G
Myoglobin	,	Т
Myosin 15	MYO15	S
Myosin 5A	MYO5A	S
Myosin 6	MYO6	S
Myosin 7A	MYO7A	S
Myosin, cardiac	MYH7	S
Myosin, light chain 2	MYL2	S
Myosin, light chain 3	MYL3	S
•	MTM1	S S
Myotubularin		
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3	G
Na+/H+ exchanger 1	NHE1	T
Na+/H+ exchanger 2	NHE2	T
Na+/H+ exchanger 3	NHE3	T
Na+/H+ exchanger 4	NHE4	T
Na+/H+ exchanger 5	NHE5	Т
Na+coupled glucose/galactose transporter		T
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	Ε
N-acetylglucosamine-6-sulfatase	GNS	Ε
N-acetylglucosaminidase, alpha	NAGLU	E
NADH dehydrogenase		Ε
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS1	Ε
protein 1		
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS4	Ε
protein 4		
NADH dehydrogenase (ubiquinone)	NDUFV1	Ε
flavoprotein 1		
NADH-cytochrome b5 reductase	DIA1	Ε
NADPH-dependent cytochrome P450	POR	E
reductase		
NB6		1
Nephrolithiasis 2	NPHL2	T
Nephronophthisis 1	NPHP1	Ť
Nephronophthisis 2	NPHP2	Ť
Nephrosis 1	NPHS1	Ť
Nerve growth factor	NGF	Ġ
Nerve growth factor receptor	NGFR '	G
Neuraminidase sialidase	NEU	T
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neurotensin	NTS	Ν

Neurotensin receptor Notch ligand - jagged 1 Nuclear factor I-kappa-B-like gene Oncogene ERB Oncogene ERB2 Oncogene ERBA Oncogene ERBAL2	NTSR1 JAG1, AGS IKBL	N G - G G G
Oncogene GLI1	GLI	G G
Oncogene GLI2	GLI2	G
Oncogene GLI3	GLI3	G
Oncogene met	MET	G
Oncogene myb	MYB	Ğ
Oncogene myc	MYC	Ğ
Oncogene n-myc		· G
Oncogene ret	RET	Ğ
Oncogene r-myc		Ğ
Oncogene sis	PDGFB	Ğ
Oncogene spi1		Ğ
Oncogene src		G
Oncogene v-Ki-ras2	KRAS2	. G
Orexin	OX .	G
Orexin 1 receptor	OX1R	G
Orexin 2 receptor	OX2R	. G
Ornithine transcarbamoylase	OTC, NME1	Ε
Osteopontin	OPN	G
Paired box homeotic gene 2	PAX2	G
Paired box homeotic gene 3	PAX3	G.
Paired box homeotic gene 6	PAX6	G
Paired box homeotic gene 8	PAX8	G
Palmitoyl-protein thioesterase	PPT	T
Pancreatic amylase		Е
Pancreatic colipase		Т
Pancreatic lipase	PNLIP	E
Pancreatic lipase related protein 1	PLRP1	Ε
Pancreatic lipase related protein 2	PLRP2	Ε
Paraoxonase PON1	PON1	Е
Paraoxonase PON2	PON2	Ε
Paraoxonase PON3	• •	E
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	G
Parathyroid hormone-like hormone	PTHLH	G
Parvalbumin	PVALB	G
Patched (Drosophila) homolog, PTCH	PTCH	G
Pepsin		T
Pepsinogen		E
Peptidases A		T
Peptidases B		Т

Peptidases C		Т
Peptidases D	PEPD	Т
Peptidases E		T
Peptidases S	·	T
Peroxidase, salivary	SAPX	Ε
Peroxisomal membrane protein 1	PXMP1	S
Peroxisomal membrane protein 3	PXMP3	T
Peroxisome biogenesis factor 1	PEX1	T
Peroxisome biogenesis factor 19	PEX19	Ť
Peroxisome biogenesis factor 6	PEX6	Ť
Peroxisome biogenesis factor 7	PEX7	Ť
Peroxisome receptor 1	PXR1	Ť
Phenylalanine monooxygenase		Ė
Phosphatase & tensin homolog	PTEN	G
	PHEX	G
Phosphate regulating gene with homologies to	FILX	J
endopeptidases on the X chromosome	PCK1	Ε
Phosphoenolpyruvate carboxykinase	PFKL	E
Phosphofructokinase, liver	PFKM	Ē
Phosphofructokinase, muscle	PERIVI	E
Phosphoglucomutase	GPI	E
Phosphoglucose isomerase	PGK1	E
Phosphoglycerate kinase 1		E
Phosphoglycerate mutase 2	PGAM2	_
Phospholipase A2, group 10	PLA2G10	1
Phospholipase A2, group 1B	PLA2G1B	1
Phospholipase A2, group 2A	PLA2G2A	ŀ
Phospholipase A2, group 2B	PLA2G2B	1
Phospholipase A2, group 4A	PLA2G4A	!
Phospholipase A2, group 4C	PLA2G4C	
Phospholipase A2, group 5	PLA2G5	,
Phospholipase A2, group 6	PLA2G6	1
Phospholipase C alpha	•	!
Phospholipase C beta		!
Phospholipase C delta	PLCD1	!
Phospholipase C epsilon		!
Phospholipase C gamma	PLCG1	
Phosphomannomutase 2	PMM2	G
Phosphomannomutase-2	PMM2	T
Phosphomannose isomerase-1, PMI1	MPI	Т
Phosphoribosyl pyrophosphate synthetase	PRPS1	Ε
Phosphorylase kinase deficiency, liver	PHK	Ε
Phosphorylase kinase, alpha 1 (muscle)	PHKA1	Ε
Phosphorylase kinase, alpha 2	PHKA2	Ε
Phosphorylase kinase, beta	PHKB	Ε
Phosphorylase kinase, delta		Ε
Phosphorylase kinase, gamma 2	PHKG2	Ε
Plasminogen	PLG	Ε
Plasminogen activator inhibitor 1	PAI1	Ε

Diaminana,ti-staniahilit0	DAIO	_
Plasminogen activator inhibitor 2	PAI2	Ε
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	Ε
Plasminogen activator, Urokinase	UPA; PLAU	Ε
Platelet derived growth factor	PDGF	Ğ
Platelet derived growth factor receptor	PDGFR	
Platelet monamine oxidase	FDGFK	G
	DAED	T
Platelet-activating factor receptor	PAFR	ı
Polycystic kidney and hepatic disease 1	PKHD1	T
Polycystin 1	PKD1	T
Polycystin 2	PKD2	Т
Polymorphonuclear elastase		T
Potassium inwardly-rectifying channel J1	KCNJ1	Ν
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel E1	KCNE1	N
Prekallikrein]
Preproenkephalin	PENK	N
Preproglucagon	GCG;GLP1; GLP2	
• •	GCG,GLF1, GLF2	G
Preproglucagon		T
Preproinsulin	·	Ţ
Procollagen N-protease		Ε
Proline dehydrogenase	PRODH	E
Proline-rich protein BstNI subfamily 1	PRB1	S
Proline-rich protein BstNI subfamily 3	PRB3	S
Proline-rich protein BstNI subfamily 4	PRB4	S
Prolyl-4-hydroxylase		E
Pro-melanin-concentrating hormone	PMCH	G
Proopiomelanocortin	POMC	N
Prosaposin	PSAP	N
Prostacyclin synthase		1
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	1
Prostaglandin D - DP receptor	1101 5,1 0511	1
Prostaglandin E1 receptor		1
Prostaglandin E2 receptor		1
·		1
Prostaglandin E3 receptor		!
Prostaglandin F - FP receptor		Į.
Prostaglandin F2 alpha receptor		ı
Prostaglandin I2 receptor		Т
Prostaglandin IP receptor		- 1
Protease inhibitor 1		Т
Protective protein for beta-galactosidase	PPGB	Ε
Protein C	PROC	1
Protein C inhibitor	PCI	i
Protein kinase B	PRKB	•
Protein S	PROS1	1
Protein tyrosine phosphatase, non-receptor	PTPN12	Ġ
type 12	1 10 1412	G
	E2	,
Prothrombin precursor	F2	1

Pterin-4-alpha-carbinolamine	PCBD	
Pyruvate carboxylase	PC	Ε
Pyruvate decarboxylase	PDHA	Ε
Pyruvate kinase	PKLR	Ε
Quinoid dihydropteridine reductase	QDPR	Ε
Renal glutaminase		T
Renin	REN	Ε
Replication factor C	RFC2	Ε
Retinoblastoma 1	RB1	G
Retinol binding protein 1		Т
Retinol binding protein 2		Т
Retinoschisis, X-linked, juvenile	RS	G
RIGUI	RIGUI	G
SA homolog	SAH	G
Salivary amylase, AMY1		Т
SAP (SLAM-associated protein)	SH2D1A	1
Secretin	SCT	Т
Secretin receptor, SCTR	SCTR	Т
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	Ν
Serotonin receptor, 5HT2A	HTR2A	Ν
Serotonin receptor, 5HT2B	HTR2B	Ν
Serotonin receptor, 5HT2C	HTR2C	Ν
Serotonin receptor, 5HT3	HTR3	Ν
Serotonin receptor, 5HT4	HTR4	Ν
Serotonin receptor, 5HT5	HTR5	Ν
Serotonin receptor, 5HT6	HTR6	Ν
Serotonin receptor, 5HT7	HTR7	Ν
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	Ν
Sodium channel, non-voltage gated 1, gamma	SCNN1G	Ν
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		
Solute carrier family 10 (sodium/bile acid	SLC10A1	·T
cotransporter family),member 1		
Solute carrier family 10 (sodium/bile acid	SLC10A2	T
cotransporter family), member 2	•	
Solute carrier family 12, member 1	SLC12A1	T
Solute carrier family 12, member 2	SLC12A2	T
Solute carrier family 12, member 3	SLC12A3	Т
Solute carrier family 14, member 2	SLC14A2	T
Solute carrier family 15 (H+/peptide	SLC15A1	Т
transporter, intestinal), member 1		
Solute carrier family 15 (H+/peptide	SLC15A2	T

transporter kidney) member 2		
transporter, kidney), member 2 Solute carrier family 16 (monocarboxylate	SLC16A1	 -
transporter), member 1	SECTOAT	T
Solute carrier family 16 (monocarboxylate	SLC16A7	_
transporter), member 7	SECTOAT	Т
Solute carrier family 17, member 1	SLC17A1	-
Solute carrier family 17, member 2	SLC17A1 SLC17A2	T
Solute carrier family 2 (facilitated glucose		T
transporter), member 1	SLC2A1	T
Solute carrier family 2 (facilitated glucose	SLC2A2	_
transporter), member 2	SLCZAZ	Т
Solute carrier family 2 (facilitated glucose	SLC2A3	_
transporter), member 3	SLC2A3	Т
Solute carrier family 2 (facilitated glucose	SLC2A4	_
transporter), member 4	SLUZA4	T
Solute carrier family 2 (facilitated glucose	SLCOAF	_
transporter), member 5	SLC2A5	Т
Solute carrier family 21, member 2	SLC21A2	_
Solute carrier family 21, member 2	SLC21A2 SLC21A3	T
Solute carrier family 22, member 1	SLC22A1	T
Solute carrier family 22, member 2		T
Solute carrier family 22, member 5	SLC22A2	T
Solute carrier family 3 (facilitated glucose	SLC22A5	T
transporter), member 1	SLC3A1	Т
Solute carrier family 4 (anion exchanger),	SI CAAA	~
member 1	SLC4A1	T
Solute carrier family 4 (anion exchanger),	SLC4A2	_
member 2	SLC4A2	T
Solute carrier family 4 (anion exchanger),	SLC4A3	Т
member 3	0204/03	1
Solute carrier family 5 (sodium/glucose	SLC5A1	Т
transporter), member 1	CLOOKI	1
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2	0E00/12	•
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5	0200,10	'
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ACID transporter), member 1	-	١.
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3	0200710	'
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2	CEGONE	•
Solute carrier family 6, member 6	SLC6A6	т
Solute carrier family 7(amino acid transporter),		T
member 1	OLO/A1	1
Solute carrier family 7(amino acid transporter),	SLC7A2	Т
member 2	CLOTTL	1

Solute carrier family 7(amino acid transporter), member 7	SLC7A7	Т
Somatostatin	SST	N.I
Somatostatin receptor, SSTR1	SSTR1	N
Somatostatin receptor, SSTR2	SSTR2	N
Somatostatin receptor, SSTR3		G
,	SSTR3	N
Somatostatin receptor, SSTR4	SSTR4	N
Somatostatin receptor, SSTR5	SSTR5	N
Sphingomyelinase	SMPD1	Ε
Steroid 5 alpha reductase 1	SRD5A1	E
Steroid 5 alpha reductase 2	SRD5A2	E
Sterol carrier protein 2	SCP2	T
Substance P		Ν
Succinyl CoA synthase		Ε
Sucrase		Ε
Sucrase-isomaltase	SI	T
Superoxide dismutase 1	SOD1	Ε
Surfeit 1	SURF1	G
Talin	TLN	G
Talin, TLN		S
TATA binding protein	TBP	G
T-BOX 1	TBX1	G
T-BOX 2	TBX2	G
T-BOX 3	TBX3	G
Thiolase, perioxisomal		E
Thrombin receptor	F2R	1
Thrombopoietin	THPO	G
Thromboxane A synthase 1	TBXAS1	1
Tip-associated protein	TAP	1
Topoisomerase I		Ε
Torticollis, keloids, cryptorchidism and renal	TKCR	G
dysplasia gene		
Transacylase		E
Transcobalamin 1, TCN1		Т
Transcobalamin 2, TCN2	TCN2	Т
Transcription factor 1, hepatic	TCF1	G
Transcription factor 2, hepatic	TCF2	G
Transferrin	TF	Ğ
Transferrin receptor	TFRC	G
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	Ğ
Transforming growth factor, beta receptor 2	TGFBR2	Ğ
Transglutaminase 4	TGM4	Ğ
Transketolase	TKT	Ē
Transketolase-like 1	TKTL1	Ē.
Translocation in renal carcinoma on	TRC8	G
chromosome 8 gene		_
Transthyretin	TTR	Т
	1113	,

Trehalase		Т
Triosephosphate isomerase	TPI1	E
Trypsin inhibitor		E
Trypsinogen 1	TRY1	E
Trypsinogen 2	TRY2	E
Trypsinogen activation peptide		Т
Tuberous sclerosis 1	TSC1	G
Tuberous sclerosis 2	TSC2	Ğ
Tumour necrosis factor (TNF) receptor	TRAF1	1
associated factor 1		·
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2	11002	•
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3	110110	•
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4	110414	•
	TRAF5	;
Tumour necrosis factor (TNF) receptor associated factor 5	TIVALU	•
Tumour necrosis factor (TNF) receptor	TRAF6	ŧ
associated factor 6	ITALO	•
	TNFA	
Tumour necrosis factor alpha	TNFAR	i
Tumour necrosis factor alpha receptor Tumour necrosis factor beta	TNFB	i
	TNFBR	. 1
Tumour necrosis factor beta receptor	TP53, P53	Ġ
Tumour protein p53	TP63	G
Tumour protein p63	DRA	I
Tumour suppresssor gene DRA	TYR	Ė
Tyrosinase	1117	E
UDP-glucose pyrophosphorylase	uatta LICT1	E
UDP-glucuronosyltransferase 1	ugt1d, UGT1 UGT2	E
UDP-glucuronosyltransferase 2	GALE	E
Uridinediphosphate(UDP)-galactose-4-	GALE	L
epimerase	LIDOD	E
Uroporphyrinogen decarboxylase	UROD	E
Uroporphyrinogen III synthase	UROS	
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	N
Vasoinhibitory peptide		G
Villin	.	S
Von Hippel-Lindau gene	VHL	· G
Von Willebrand factor	VWF	Ţ
Wiskott-Aldrich syndrome protein	WASP, THC	1
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	G
Wolfram syndrome 1 gene	WFS1	S
Xanthine dehydrogenase	XDH	E
Xeroderma pigmentosum, complementation	XPA	E
group A	VDD	
Xeroderma pigmentosum, complementation	XPB	E

group B	•	
Xeroderma pigmentosum, complementation	XPC	Ε
group C		
Xeroderma pigmentosum, complementation group D		Ε
Xeroderma pigmentosum, complementation group E		Ε
Xeroderma pigmentosum, complementation group F	XPF	E
Xeroderma pigmentosum, complementation group G	ERCC5	Ε
Zinc finger protein 3	ZIC3	S

In a tenth aspect.

RESPIRATORY SYSTEM

The present invention relates to a method of assessing the risk of developing clinical or social consequences following dysfunction, damage or disease of the respiratory system and indicating appropriate therapeutic interventions.

The human body has an absolute requirement for oxygen in order to carry out the basic metabolic processes required for survival. The portal of entry for oxygen is the respiratory system (mouth, nose, trachea, bronchi, bronchioles, alveoli and the vascular elements which transport oxygen, pulmonary arteries, veins, capillaries and lymphatic tissues). The respiratory system is required to work 24 hours a day for a lifetime. Despite the exposure of the respiratory system to pollution and airborne pathogens the systems capacity for defence and repair enables it to ward off pathology and continue normal function. However, excessive pollution or a compromised defence system will lead to damage and disease. For example, smoking which is now known to damage lung function leading to infection and tumourigenesis, and defects such as cystic fibrosis where mutations in lung proteins lead to a compromise in function and susceptibility to infections.

The major functions of the respiratory system include:

- Pumping gases into and out of the body.
- Gas exchange (oxygen into the body and carbon dioxide out of the body).
- Matching oxygen supply to bodily requirements.

These functional requirements place considerable demands on the structural organisation of the lungs. In order to facilitate gas exchange the surface area of air /blood contact must be as large as possible (the surface area of the lungs is almost the size of a tennis court, Weatherall, Leadingham and Warrell 1996). In addition, the tissue barrier between air and blood must be as thin as possible. These requirements lead directly to the specialised structures seen the tissues of the respiratory system.

The specialised tissues mediating air/blood contact (alveoli) need to be supported during the pumping movements of the lung and this is achieved by the presence of the peripheral fibre system which encases the tissues (in close aposition to blood vessels) from the hilum to the visceral pleura. The tissues which make up the gas exchange surface in the alveoli must be capable of allowing blood access to the oxygen and of defending and repairing themselves when damaged by airborne contaminants or pathogens. The alveoli are composed of three layers of cells, the epithelium (lining the air spaces composed of type I and type II - secretory cells), an interstitial layer housing the connective tissue and an endothelium lining the capillaries. In addition there are alveolar macrophages which represent a core feature of the tissue defence system. One of the important aspects of type II cell function is the secretion of surfactants (primarily DPPC – dipalmitoylphosphatidylcholine with a number of apoproteins SP-A, SP-B, SP-C)) which act to reduce the surface tension at the air water interface and prevent the surfaces of the alveoli sticking to each other. The control of surfactant synthesis and its removal are tightly regulated (by neurohumoral

pathways and vagal stimulation). The control of surfactant production is particularly important in the foetus during lung development.

Alveolar macrophages are present within the liquid layer of surfactant. These cells act as the first line of defence in order to intercept and remove unwanted or foreign materials on the surface of the lungs. They co-operate in their defence activity with interstitial macrophages, histiocytes, leucocytes, and mast cells.

In situations where alveolar cell activity cannot cope with environmental damage (e.g. inhalation of toxic fumes, massive blood loss) the epithelium can become damaged beyond its capacity to repair and so the alveoli become oedematous leading to a loss of the gas exchange function. This situation requires intensive medical management and in many cases will lead to permanent loss of lung functionality. The situation can be excaberated if there is a significant inflammatory reaction within the lung tissues (e.g. chronic bronchitis, emphysema, asthma, lung transplant rejection etc.).

The lung has a series of 'housekeeping' processes which are essential in order to maintain its normal function (Weatherall, Leadingham and Warrell 1996):

- Surfactant synthesis and release in order to promote and maintain a low surface tension in alveoli.
- Clearance of particulate matter and identification of potential pathological inflammatory reactions and pathogens.
- Regulation of smooth muscle tone in vascular walls and lung tissues.
- Clearance of fluids to prevent oedema.
- Regulation of hormones in the pulmonary capillary endothelium.

Failure to maintain normal housekeeping functions can lead to a wide variety of conditions such as chronic obstructive pulmonary disease, asthma, diffuse interstitial fibrosis, alveolar filling, adult respiratory distress syndrome, pulmonary vascular disease. Such houskeeping functions are also readily compromised by the presence of tumours within the respiratory system.

The effect of dysfunction, damage or disease in the respiratory system will often manifest itself as cough (a defensive reflex designed to clear the lower respiratory tract), breathlessnes (this symptom ranges from shortness of breath following exercise to severe breathing problems whilst lying in bed) and chest pain (only the upper respiratory tract and parietal pleura are sensitive to pain). Further detailed examination of the patient including an assessment of other physical signs (e.g. abnormalities in shape of chest wall, cyanosis, clubbing of fingers, eczema, uticaria, sarcoidosis, tuberous sclerosis, abnormalities in the cardiovascular system or swelling in the lymphatic system) and imaging studies in order to identify specific syndromes or diseases.

The clinical spectrum of the dysfunction, damage and disease of the respiratory system is broad and includes:

Allergic rhinitis ('hay fever').

Airway obstruction (e.g tumours, foreign body).

Asthma.

Cystic fibrosis.

Bronchiectasis.

Chronic obstructive pulmonary disease.

Diffuse parenchymal lung disease.

Cryptogenic fibrosing alveolitis.

Pulmonary vasculitis.

Pulmonary haemorrhagic disorders.

Allergic alveolitis.

Sarcoidosis.

Toxin induced damage.

Pleural disease.

Scoliosis.

Neoplasia.

Sleep related apnoea's

Upper respiratory tract infections (e.g. Coxsackie A, echovirus, influenza, coronavirus, mycoplasma, staphylococcus).

Lower respiratory tract infections (e.g. respiratory syncitial virus, influenza, measles, rhinovirus, pneumococcus, legionella, mycoplasma, tuberculosis).

Some groups of patients such as those with AIDS, or undergoing immunosuppression therapy following transplants or chemotherapy are particularly susceptible to infections of the respiratory system. Pulmonary involvement can also be prominent in systemic collagen-vascular diseases (e.g. rheumatoid arthritis, systemic lupus erythromatosus, ankylosing spondylitis).

Therapeutic approaches to dysfunction, damage and disease of the respiratory system include, antibiotics, antiviral agents, cytotoxic chemotherapy (for lung tumours), anti-inflammatory therapies (for asthma) and approaches to gene therapy (for inherited disorders such as cystic fibrosis). In addition surgical approaches such as resection or transplantation dramatically improve the chances of survival of patients with disorders such as lung cancer and pulmonary hypertension (although the issue of tissue rejection remains a problem). In cases where surgery or transplantation is inappropriate (e.g deep coma following head injury, in patients with respiratory failure due to muscular or skeletal disorders or in patients undergoing chest surgery) machine assisted ventilation has made significant progress.

However, many of these drugs also have side-effects such as sedation, orthostatic hypertension, sexual dysfunction, reflex tachycardia and impaired cognition (Brody, Larner and Minneman 1998, British National Formulary 1998). As a result of the side effects and the disordered mental state of many patients compliance in drug therapy is a significant issue in healthcare management. Such problems can be greatly magnified when dealing with patients with a personality disorder.

The physiology and control of the body's respiratory system is extremely complex and involves the synergistic or inhibitory interaction between multiple regulatory pathways and molecular cascades. Variation in the functionality of the proteins involved in these processes will, inevitably, cause or have an impact on the

functioning of these systems or an individuals attempts to minimise damage and restore function following dysfunction, damage or disease in these systems. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from clinical or social consequences following dysfunction, damage or disease of the respiratory system including genetic history, age, sex, nutritional status, pre-existing disease or injury, drug treatments and socio-economic circumstances. Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to the occurrence of dysfunction, damage or disease of the respiratory system and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at the heart of the difficulties experienced in the healthcare and social management of respiratory system dysfunction, damage and disease.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

RESPIRATORY GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	Ε
2,3-bisphosphoglycerate mutase	BPGM	Ε
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	E
Acetoacetyl 1-CoA-thiolase	ACAT1	E
Acetoacetyl 2-CoA-thiolase	ACAT2	E
Acetyl CoA synthase		E
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Aconitase		E
Acyl CoA dehydrogenase, long chain	ACADL	E
Acyl CoA dehydrogenase, medium chain	ACADM	Ε
Acyl CoA dehydrogenase, short chain	ACADS	E
Acyl CoA dehydrogenase, very long chain	ACADVL	E
Adaptin, beta 3A	ADTB3A	T
Adenosine deaminase	ADA	E
Adenosine receptor A1	ADORA1	N

Adenosine receptor A2A Adenosine receptor A2B Adenosine receptor A3 Adenylate cyclase 1 Adenylate cyclase 2 Adenylate cyclase 3 Adenylate cyclase 4 Adenylate cyclase 5 Adenylate cyclase 6 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 9 Adrenergic receptor, alpha1 Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH)	ADORA2A ADORA3 ADORA3 ADCY1 ADCY2 ADCY3 ADCY4 ADCY5 ADCY6 ADCY7 ADCY8 ADCY9 ADCY9 ADRA1 ADRA2 ADRB1 ADRB2 ADRB3 ACTHR	X X X M M M M M M M M X X X X X G
receptor Albumin, ALB	ALB	. т
Alcohol dehydrogenase 1	ADH1	Ε
Alcohol dehydrogenase 2	ADH2	Ε
Alcohol dehydrogenase 3	ADH3	E
Alcohol dehydrogenase 4	ADH4	E
Alcohol dehydrogenase 5	ADH5	E
Alcohol dehydrogenase 6	ADH6	E
Alcohol dehydrogenase 7	ADH7	E
Aldolase A	ALDOA	E
Aldolase B	ALDOB	E
Aldotarana recentar	ALDOC	E
Alpha 2 magraphs with	MLR	G
Alpha 2 macroglobulin	A2M	1
alpha1-antichymotrypsin alpha1-antitrypsin	AACT	E
alpha2-antiplasmin	Pl	E
alpha-actinin 2	PLI	E .
alpha-actinin 3	ACTN2	G
alpha-Galactosidase A	ACTN3 GLA	G
alpha-ketoglutarate dehydrogenase	GLA	E
Aminopeptidase P	XPNPEP2	E E
Amphiregulin	AREG	G
Androgen receptor	AR	G
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	E
Angiotensin receptor 1	AGTR1	Ť
Angiotensin receptor 2	AGTR2	Ť
Angiotensinogen	AGT	Ė
-		_

Annexin 1 Antidiuretic hormone receptor Antithrombin III Apolipoprotein E Arginase	ANX 1 ADHR AT3 APOE ARG1	I T E T E
Arginine vasopressin Arginine vasopressin receptor 1A	AVP AVPR1A	N
Arginine vasopressin receptor 1B	AVPR1B	N N
Arginine vasopressin receptor 2	AVPR2	N
Arginosuccinate lyase	ASL	E
Arylsulfatase D	ARSD	E
Arylsulfatase E	ARSE	
Arylsulfatase E Arylsulfatase F	ARSF	Ε
•	ARSF	E
Aspartate transaminase Ataxia telangiectasia gene, AT ATP/ADP translocase	ATM	T G E
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
beta-galactosidase	GLB1	E
beta-Glucuronidase	GUSB	E
Biotinidase	BTD	E
Bloom syndrome protein	BLM	G
Bradykinin receptor B1	PLIM	G
• • • • • • • • • • • • • • • • • • • •		- !
Bradykinin receptor B2	DOLLE	ļ
Butyrylcholinesterase	BCHE	E
C1 inhibitor	00114	E
Cadherin E	CDH1	G
Cadherin EP	05110	G
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calcitonin receptor /Calcitonin gene-related peptide receptor	CALCR	N
Calcitonin/Calcitonin gene-related peptide	CALCA	Ν
alpha		
Calcium channel, voltage-dependent, alpha 1F subunit	CACNA1F	N
Calcium channel, voltage-dependent, Alpha- 1B (CACNL1A5)	CACNA1B	N
Calcium channel, voltage-dependent, Alpha- 1C	CACNA1C	Ν
Calcium channel, voltage-dependent, Alpha- 1D	CACNA1D	Ν
Calcium channel, voltage-dependent, Alpha- 1E (CACNL1A6)	CACNA1E	Ν
Calcium channel, voltage-dependent, Alpha- 2/delta	CACNA2	N

Calcium channel, voltage-dependent, Beta 1 Calcium channel, voltage-dependent, Beta 3 Calcium channel, voltage-dependent, Neuronal, Gamma	CACNB1 CACNB3 CACNG2	N N N
Calcium channel, voltage-dependent, T-type Calmodulin 1 Calmodulin 2	CALM1 CALM2	NGGG
Calmodulin 3	CALM3	G
Calnexin	CANX	G
Carbonic anhydrase 3	CA3 CA4	E
Carbonic anhydrase 4	=:::	E
Carbonic anhydrase, alpha	CA1 CA2	E
Carbonic anhydrase, beta		E
Carnitine acetyltransferase	CRAT	E
Carnitine acylcarnitine translocase		-
Catalase	CAT	Ė
Cathepsin B		E
Cathepsin D		E
Cathepsin E	CTSG	E
Cathepsin G	C13G	E
Cathepsin H Cathepsin K	CTSK	E
Cathepsin L	01010	Ē
Cathepsin S	•	Ē
CD1	ÇD1	ī
CD4	CD4	i
Cell adhesion molecule, intercellular, ICAM	ICAM1	Ġ
Cell adhesion molecule, leukocyte-	LECAM1	Ğ
endothelial, LECAM (CD62)		_
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	Ğ
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	PECAM1	G
PECAM		
Cell adhesion molecule, vascular, VCAM	VCAM1	G
Chemokine receptor CXCR4	CXCR4	- 1
Chitotriosidase	chit	Ε
Cholecystokinin	CCK	Ν
Cholecystokinin B receptor	CCKBR	Ν
Choline acetyltransferase	CHAT	Ε
Citrate synthase		Ε
Coenzyme Q (CoQ)/ubiquinone		Ε
Collagen I alpha 1	COL1A1	S
Collagen I alpha 2	COL1A2	S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S
= = ··= J=·· · · · · · · · · · · · · · ·		

Coproporphyrinogen oxidase	СРО	E
Corticotrophin-releasing hormone	CRH	Ŧ
Corticotrophin-releasing hormone receptor	CRHR1	Ť
Cortisol receptor	Ord IIV	i
C-reactive protein CRP		i
Creatine kinase – B and m	CKBE	Ė
		E
Creb binding protein	CREBBP	G
		E
Cyclic AMP-dependent protein kinase	PKA	E
Cyclic nucleotide phosphodiesterase 1B	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	E
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	E
Cyclic nucleotide phosphodiesterase 3B	PDE3B	Ε
Cyclic nucleotide phosphodiesterase 4A	PDE4A	Ε
Cyclic nucleotide phosphodiesterase 4C	PDE4C	Ε
Cyclic nucleotide phosphodiesterase 5A	PDE5A	Ε
Cyclic nucleotide phosphodiesterase 6A	PDE6A	Ε
Cyclic nucleotide phosphodiesterase 6B	PDE6B	Ε
Cyclic nucleotide phosphodiesterase 7	PDE7	E
Cyclic nucleotide phosphodiesterase 8	PDE8	E
Cyclic nucleotide phosphodiesterase 9A	PDE9A	Ε
Cyclin-dependent kinase 2	CDK2	G
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	G
Cyclooxygenase 1	COX1	Ε
Cyclooxygenase 2	COX2	E
CYP11A1	CYP11A1	Ε
CYP11B1	CYP11B1	Ε
CYP11B2	CYP11B2	Ε
CYP17	CÝP17	E
CYP19	CYP19	Ε
CYP1A1	CYP1A1	Ε
CYP1A2	CYP1A2	Ε
CYP1B1	CYP1B1	Е
CYP21	CYP21	Ε
CYP24	CYP24	Ε
CYP27	CYP27	Ε
CYP27B1	PDDR	Ε
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	E
CYP2A6V2 .	CYP2A6V2	Ē
CYP2A7	CYP2A7	Ē
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	Ē
CYP2C19	CYP2C19	Ē
CYP2C8	CYP2C8	E
CYP2C9	CYP2C9	E
O I F Z O B	011200	i

CYP2D6	CYP2D6	Ε
CYP2E1	CYP2E1	Ε
CYP2F1	CYP2F1	Ε
CYP2J2	CYP2J2	Ε
CYP3A3	CYP3A3	Ε
CYP3A4	CYP3A4	E
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	Ē
CYP4A11	CYP4A11	Ē
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	E
CYP4F3		F
CYP51	CYP51	E
CYP5A1	CYP5A1	E
CYP7A		E
CYP8		E
Cystathionase		Ē
Cystathione beta synthase		E
Cystic fibrosis transmembrane conductance		N
regulator, CFTR		
Cytidine deaminase	CDA	Ε
Cytidine-5-prime-triphosphate synthetase		Ē
Cytochrome a		E
Cytochrome b-245 alpha		E
Cytochrome b-245 beta		Ē
Cytochrome b-5		E
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	•	ī
binding protein 1		•
Cytokine-suppressive antiinflammatory drug-	CSBP2	ı
binding protein 2		
DAX1 nuclear receptor	DAX1	ı
D-beta-hydroxybutyrate dehydrogenase		Ε
Delta 4-5 alpha-reductase		Ε
Desmin	DES	S
Dihydrolipoamide dehydrogenase	DLD	N
DNA glycosylases	• .	E
Dopamine beta hydroxylase	DBH	Ε
Dopamine receptors D1	DRD1	Ν
Dopamine receptors D2	DRD2	Ν
Dopamine receptors D3	DRD3	Ν
Dopamine receptors D4	DRD4	N
Dopamine receptors D5		N
Dystrophin		S
Elastase 1		Ē
Elastase 2		E
Elastin	ELN	S
•		

Electron-transfering-flavoprotein alpha Electron-transfering-flavoprotein beta Electron-transferring flavoprotein dehydrogenase	ETFA ETFB ETFDH	T T E
Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Enolase Enoyl CoA hydratase Enoyl CoA isomerase	EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB ENO1	
Enoyl CoA reductase Enterokinase Ephrin receptor tyrosine kinase A Ephrin receptor tyrosine kinase B Epidermal growth factor Epidermal growth factor receptor Epoxide hydrolase 1, microsomal Estrogen receptor EWS RNA-binding protein Eyes absent 1 Faciogenital dysplasia Factor 1 (No. one) Factor B, properdin	PRSS7, ENTK EPHA EPHB EGF EGFR EPHX1 ESR EWSR1 EYA1 FGD1, FGDY F1	EEGGGGEGGGTII
Factor D Factor H Factor I (letter I) Factor III Factor IX Factor V Factor VIII Factor VIII Factor X Factor XI Factor XII Factor XIII A & B Fc fragment of IgG, high affinity IA, receptor for	HF1 IF F3 F9 F5 F7 F8 F10 F11 F12 F13A & F13B FCGR1A	
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	G
Fc fragment of IgG, low affinity Illa, receptor for (CD16)	FCGR3A	G
Fibrillin 1 Fibrinogen alpha Fibrinogen beta Fibrinogen gamma	FBN1 FGA FGB FGG	G S S S

Fibroblast growth factor Fibroblast growth factor receptor 1 Fibroblast growth factor receptor 2 Fibroblast growth factor receptor 3 Fibronectin precursor Flightless-II, Drosophila homolog of Follicle stimulating hormone receptor Follicle stimulating hormone, FSH	FGF1 FGFR1 FGFR2 FGFR3 FN1 FLII FSHR, ODG1 FSHB	00.000000
Forkhead rhabdomyosarcoma gene Fructose-1,6-diphosphatase Furin	FKHR FBP1	G E T
GABA receptor, alpha 1 GABA receptor, alpha 2 GABA receptor, alpha 3	GABRA1 GABRA2 GABRA3	N N N
GABA receptor, alpha 4 GABA receptor, alpha 5 GABA receptor, alpha 6	GABRA4 GABRA5 GABRA6	N N N
GABA receptor, beta 1 GABA receptor, beta 2 GABA receptor, beta 3	GABRB1 GABRB2 GABRB3	N N N
GABA receptor, gamma 1 GABA receptor, gamma 2	GABRG1 GABRG2	N N
GABA receptor, gamma 3 GABA transaminase Galactocerebrosidase	GABRG3 ABAT GALC	N E E
Galactosyltransferase 1 Galactosyltransferase, alpha 1,3 Galactosyltransferase, beta 3	GT1 GGTA1 B3GALT	G G
Glucocorticoid receptor Glucokinase Glucosidase, acid alpha	GRL GCK GAA	G E E
Glutamate dehydrogenase Glutamate receptor 1 Glutamate receptor 2	GLUD1 GLUR1 GLUR2	E N N
Glutamate receptor 3 Glutamate receptor 4 Glutamate receptor 5	GLUR3 GLUR4 GLUR5	N N N
Glutamate receptor 6 Glutamate receptor 7 Glutamate receptor, ionotropic, NMDA 1	GLUR6 GLUR7 NMDAR1	N N N
Glutamate receptor, ionotropic, NMDA 2A Glutamate receptor, ionotropic, NMDA 2B Glutamate receptor, ionotropic, NMDA 2C	NMDAR2A NMDAR2B. NMDAR2C	N N N
Glutamate receptor, ionotropic, NMDA 2D Glutathione Glutathione peroxidase, GPX1	NMDAR2D GSH GPX1	N T E
Glutathione peroxidase, GPX1 Glutathione peroxidase, GPX2 Glutathione reductase, GSR	GPX2 GSR	E E

Glutathione S-transferase mu 1, GSTM1	GSTM1	Е
Glutathione S-transferase mu 4, GSTM4		Ε
Glutathione S-transferase theta 1, GSTT1	GSTT1	E
Glutathione S-transferase theta 2, GSTT2		E
Glutathione S-transferase, GSTP1	GSTP1	E
Glutathione S-transferase, GSTZ1	GSTZ1	E
Glutathione synthetase	GSS	Ε
Glyceraldehyde-3-phosphate	GAPDH	E
dehydrogenase, GAPDH		
Glycerol kinase	GK	, Е
Glycinamide ribonucleotide (GAR)	GART	E
transformylase		
GM2 ganglioside activator protein, GM2A	GM2A	E
Growth arrest-specific homeobox	GAX	G
Guanylyl cyclase		E
Haemoglobin alpha 1	HBA1	Т
Haemoglobin alpha 2	HBA2	Т
Haemoglobin beta	HBB	Т
Haemoglobin delta	HBD	Т
Haemoglobin gamma A	HBG1	. T
Haemoglobin gamma B	HBG2	T
Haemoglobin gamma G	HBGG	Т
Heat shock protein, HSP60		1
Heat shock protein, HSP70		1
Heat shock protein, HSP90		1
Heat shock protein, HSPA1		1
Heat shock protein, HSPA2	·	1
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	1
Hermansky-pudlak syndrome gene	HPS	T
Hexokinase 1	HK1	E
Hexokinase 2	HK2	Ε
Hexosaminidase A	HEXA,TSD	E
Histamine receptors, H1		N
Histamine receptors, H2		N
Histamine receptors, H3	•	N
HMG-CoA lyase	HMGCL	E
HMG-CoA reductase	HMGCR	E
HMG-CoA synthase	HMGCS2	E
Holocarboxylase synthetase	HLCS	E
Hyaluronidase		T
Hypoxia inducible factor 1	HIF1A	E
Hypoxia inducible factor 2		E
Immunoglobulin E (IgE) reponsiveness gene	IGER	1
Immunoglobulin E (IgE) serum concentration	IGES	ĺ
regulator gene		
Immunoglobulin gamma (IgG) 2	IGHG2	1
Insulin	INS	G

Insulin receptor	INSR G	;
Insulin-like growth factor 1	GIGF1 G	j
Insulin-like growth factor 1 receptor	IGF1R G	
Insulin-like growth factor 2	IGF2 G	
Insulin-like growth factor 2 receptor	IGF2R G	
Integrin beta 1	ITGB1 G	
Integrin beta 2	ITGB2 G	
Integrin beta 5	ITGB5 G	
Integrin beta 6	ITGB6 G	
Integrin, alpha M	ITGAM G	
Inter-alpha-trypsin inhibitor, IATI	E	
Interferon alpha		
Interferon beta	IFNA1 [
	•	
Interferon gamma	IFNG I	
Interferon gamma receptor 1	IFNGR1 I	
Interferon gamma receptor 2	IFNGR2 I	
Interferon regulatory factor 1	IRF1	
Interferon regulatory factor 4	IRF4	
Interleukin(IL) 1 receptor	IL1R I	
Interleukin(IL) 1, alpha	IL1A I	
Interleukin(IL) 1, beta	IL1B I	
Interleukin(IL) 10	IL10	
Interleukin(IL) 10 receptor	IL10R I	
Interleukin(IL) 11	IL11	
Interleukin(IL) 11 receptor	IL11R	
Interleukin(IL) 12	IL12	
Interleukin(IL) 12 receptor, beta 1	IL12RB1	
Interleukin(IL) 13	IL13	
Interleukin(IL) 13 receptor	IL13R	
Interleukin(IL) 2	IL2	
Interleukin(IL) 2 receptor, alpha	IL2RA	
Interleukin(IL) 2 receptor, gamma	IL2RG	
Interleukin(IL) 3	IL3	
Interleukin(IL) 3 receptor	IL3R I	
Interleukin(IL) 4	IL4	
Interleukin(IL) 4 receptor	IL4R I	
Interleukin(IL) 5	IL5	
Interleukin(IL) 5 receptor	IL5R I	
Interleukin(IL) 6	IL6	
Interleukin(IL) 6 receptor	IL6R	
Interleukin(IL) 7	IL7	
Interleukin(IL) 7 receptor	IL7R	
Interleukin(IL) 8	IL8	
Interleukin(IL) 8 receptor		
· ·	IL8R I	
Interleukin(IL) 9	IL9	
Interleukin(IL) 9 receptor	IL9R I	
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	
Isocitrate dehydrogenase	. E	

 $\{\psi_{i},\psi_{i}\}_{i=1}^{n}$

Kallikrein 3	KAK3	1
Kininogen, High molecular weight	KNG	i
Kynureninease		Ė
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta	LTBP2	G
binding protein 2	LIBEZ .	G
Lecithin-cholesterol acyltransferase	LCAT	- -
Leptin	LEP	E
Leptin receptor	LEPR	G
Leukotriene A4 hydrolase	LEFK	G
Leukotriene A4 synthase	LTA4S	_
Leukotriene B4 receptor	LIA43	E
Leukotriene B4 synthase	LTB4S	Ī
Leukotriene C4 receptor	L1043	E
Leukotriene C4 synthase	LTC4S	
Leukotriene D4/E4 receptor	L1043	E
LIM homeobox protein 1	LHX1	. 1
Lipoamide dehydrogenase	OGDH	G
Lipoprotein lipase	LPL	E
Lipoprotein receptor, Low Density		1
Lipoprotein, High Density	LDLR	T
Lipoprotein, Intermediate Density	HDLDT1	T
Lipoprotein, Intermediate Density Lipoprotein, Low Density 1	-	Ţ
Lipoprotein, Low Density 2		T
Lipoprotein, Very Low Density	VLDLD	T
Lipoxygenase	VLDLR	T
Low density lipoprotein receptor-related	LRP	E T
protein precursor	LRP	. 1
Lymphoid enhancer-binding factor	LEF-1	0
Lysosomal acid lipase	LIPA	G
Lysozyme	LYZ	E
MAD (mothers against decapentaplegic,		. 1
Drosophila) homologue 4	MADH4	G
Malate dehydrogenase, mitochondrial	MDHO	_
Malonyl CoA transferase	MDH2	E
Mannose binding protein	MDD	E
Mannosidase, alpha B lysosomal	MBP	
Mannosidase, beta A lysosomal	MANB	E
Matrix Gla protein	MANBA	E
Matrix Gia protein Matrix metalloproteinase 1	MGP	G
	MMP1	E
Matrix metalloproteinase 10	MMP10	E
Matrix metalloproteinase 11	MMP11	E
Matrix metalloproteinase 12	MMP12	E
Matrix metalloproteinase 13	MMP13	. Е

Matrix metalloproteinase 15 Matrix metalloproteinase 15 Matrix metalloproteinase 16 Matrix metalloproteinase 17 Matrix metalloproteinase 18 Matrix metalloproteinase 19 Matrix metalloproteinase 2 Matrix metalloproteinase 3 Matrix metalloproteinase 4 Matrix metalloproteinase 5 Matrix metalloproteinase 5 Matrix metalloproteinase 6 Matrix metalloproteinase 7 Matrix metalloproteinase 8 Matrix metalloproteinase 9 Methionine adenosyltransferase Midline 1 Mitochondrial trifunctional protein, alpha	MMP14 MMP15 MMP16 MMP17 MMP18 MMP19 MMP2 MMP3, STMY1 MMP4 MMP5 MMP5 MMP6 MMP7 MMP8 MMP9 MAT1A, MAT2A MID1 HADHA	
subunit Mitochondrial trifunctional protein, beta	HADHB	E
subunit Monoamine oxidase A Monoamine oxidase B Muscarinic receptor, M1 Muscarinic receptor, M2 Muscarinic receptor, M3 Muscarinic receptor, M4 Muscarinic receptor, M5 Myoglobin Myotubularin Na+, K+ ATPase, alpha Na+, K+ ATPase, beta 1 Na+, K+ ATPase, beta 2 Na+, K+ ATPase, beta 3 NADH dehydrogenase NADH dehydrogenase (ubiquinone) Fe-S protein 1	MAOA MAOB CHRM1 CHRM2 CHRM3 CHRM4 CHRM5 MTM1 ATP1A1 ATP1B1 ATP1B2 ATP1B3 NDUFS1	
NADH dehydrogenase (ubiquinone) Fe-S protein 4	NDUFS4	E
NADH dehydrogenase (ubiquinone) flavoprotein 1	NDUFV1	E
NADH-cytochrome b5 reductase NADPH-dependent cytochrome P450 reductase	DIA1 POR	E E
Nebulin Nephrosis 1 Nerve growth factor Nerve growth factor receptor Neuraminidase sialidase	NEB NPHS1 NGF NGFR NEU	S T G G T

Neuregulin	HGL	G
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Nitric oxide synthase 1, NOS1	NOS1	E
Nitric oxide synthase 2, NOS2	NOS2	Ē
Nitric oxide synthase 3, NOS3	NOS3	E
Notch ligand - jagged 1	JAG1, AGS	G
Nucleoside diphosphate kinase-A	NDPKA	E
Oncogene ELK1	ELK1	G
Oncogene ELK2	ELK2	G
Oncogene sis	PDGFB	G
Ornithine delta-aminotransferase	OAT	E
Paired box homeotic gene 6	PAX6	Ğ
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	
Parathyroid hormone related-peptide	PTHrP	G
Parathyroid hormone-like hormone	PTHLH	G G
Patched (Drosophila) homolog, PTCH	PTCH	
Peroxisomal membrane protein 3	PXMP3	G T
Peroxisome biogenesis factor 1	PEX1	T
Peroxisome biogenesis factor 19	PEX19	Ť
Peroxisome biogenesis factor 6	PEX19	Ť
Peroxisome biogenesis factor 7	PEX7	Ť
Peroxisome receptor 1	PXR1	Ť
Phenylalanine hydroxylase	PAH	E
Phenylalanine monooxygenase	FALL	E
Phenylethanolamine N-methyltransferase,	PNMT	E
PNMT	LIMINI	_
Phosphofructokinase, liver	PFKL	_
Phosphofructokinase, muscle	PFKM	E
Phosphoglucomutase	FFNIVI	E
Phosphoglucose isomerase	CPI	E
Phosphoglycerate kinase 1	GPI PGK1	E
Phosphoglycerate mutase 2		Ε
Phospholipase A2, group 10	PGAM2	Ę
Phospholipase A2, group 10 Phospholipase A2, group 1B	PLA2G10	i
	PLA2G1B	l i
Phospholipase A2, group 2A	PLA2G2A	- 1
Phospholipase A2, group 2B	PLA2G2B	!
Phospholipase A2, group 4A	PLA2G4A	!
Phospholipase A2, group 4C	PLA2G4C	!
Phospholipase A2, group 5	PLA2G5	!
Phospholipase A2, group 6	PLA2G6	l ·
Phospholipase C epsilon		·

Pineolytic beta-receptors		Ε
Plasminogen	PLG	Ε
Plasminogen activator inhibitor 1	PAI1	Ε
Plasminogen activator inhibitor 2	PAI2	Ε
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	Ε
Plasminogen activator, Urokinase	UPA; PLAU	E
Platelet derived growth factor	PDGF	Ğ
Platelet derived growth factor receptor	PDGFR	Ğ
Platelet-activating factor receptor	PAFR	Ī
Potassium inwardly-rectifying channel J1	KCNJ1	Ň
Potassium voltage-gated channel E1	KCNE1	N
Prekallikrein		ï
Procollagen N-protease		Ė
Progesterone receptor (RU486 binding	PGR	G
receptor)		J
Proliferin	PLF	G
Proopiomelanocortin	POMC	N
Properdin P factor, complement	PFC, PFD	ï
Prosaposin	PSAP	Ņ
Prostacyclin synthase		ï
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	i
Prostaglandin D - DP receptor		i
Prostaglandin E1 receptor		i
Prostaglandin E2 receptor		i
Prostaglandin E3 receptor		Ť
Prostaglandin F - FP receptor	-	1
Prostaglandin F2 alpha receptor		ı
Prostaglandin I2 receptor		Т
Prostaglandin IP receptor		- 1
Protein C	PROC	- 1
Protein C inhibitor	PCI	1
Protein phosphatase 2, regulatory subunit A,	PPP2R1B	Ε
beta isoform		
Protein S	PROS1	1
Prothrombin precursor	F2	I
Pyruvate carboxylase	PC	Ε
Pyruvate decarboxylase	PDHA	Ε
Pyruvate kinase	PKLR	Ε
Quinoid dihydropteridine reductase	QDPR	E
Renin	REN	Ε
Replication factor C	RFC2	Ε
Retinoblastoma 1	RB1	G
RIGUI	RIGUI	G
Salivary amylase, AMY1		Т
Selectin E	SELE	Ν
Selectin L	SELL	Ν
Selectin P	SELP	Ν

Serine hydroxymethyltransferase	SHMT	Ε
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
• • • • • • • • • • • • • • • • • • • •		
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	Ν
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C		
·	HTR2C	N
Serotonin receptor, 5HT3	HTR3	Ν
Serotonin receptor, 5HT4	HTR4	Ν
Serotonin receptor, 5HT5	HTR5	Ν
Serotonin receptor, 5HT6	HTR6	Ν
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	Ν
Sodium channel, non-voltage gated 1,	SCNN1G	Ν
gamma		
Sodium channel, voltage gated, type IV,	SCN4A	Ν
alpha polypeptide		
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide	CONTE	
• ••	SLC21A2	~
Solute carrier family 21, member 2		T
Solute carrier family 4 (anion exchanger),	SLC4A1	T
member 1		
Solute carrier family 4 (anion exchanger),	SLC4A2	T
member 2		
Solute carrier family 4 (anion exchanger),	SLC4A3	Т
member 3		
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member	0200/(1	•
1		
•	01.0040	_
Solute carrier family 6 (neurotransmitter	SLC6A3	T
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	T
transporter, noradrenaline), member 2		
Somatostatin receptor, SSTR2	SSTR2	Ġ
Sphingomyelinase	SMPD1	E
Substance P	SIVII DI	
	00110	Й
Succinate dehydrogenase 2	SDH2	Ε
Succinate thiokinase	•	Ε
Succinyl CoA synthase	•	Ε
Superoxide dismutase 1	SOD1	Ε
Superoxide dismutase 3	SOD3	Ē
Surfactant pulmonary-associated protein A1	SFTPA1	T
Surfactant pulmonary-associated protein A2		
· · · · · · · · · · · · · · · · · · ·	SFTPA2	T
Surfactant pulmonary-associated protein B	SFTPB	Т

Surfactant pulmonary-associated protein C	SFTPC	Т
Surfactant pulmonary-associated protein D	SFTPD	Т
Surfeit 1	SURF1	G
Survival of motor neuron 1, telomeric	SMN1	Т
Talin	TLN	G
T-BOX 2	TBX2	G
T-BOX 3	TBX3	Ğ
TEK, tyrosine kinase, endothelial	TEK	Ε
Telomerase protein component		Ε
Thiolase, perioxisomal	• • •	Ë
Thrombin receptor	F2R	Ī
Thrombomodulin	THBD	ı
Thrombopoietin	THPO	Ġ
Thrombospondin	THBS1	Ğ
Thromboxane A synthase 1	TBXAS1	Ī
Thromboxane A2	TXA2	I
Thromboxane A2 receptor	TBXA2R	1
Thyroglobulin	TG	Ġ
Thyroid hormone receptor, alpha	THRA	G
Thyroid hormone receptor, beta	THRB	G
Thyroid peroxidase	TPO	G
Thyroid receptor auxiliary protein	TRAP	G
Thyroid-stimulating hormone receptor	TSHR	G
Thyroid-stimulating hormone, alpha	TSHA	G
Thyroid-stimulating hormone, beta	TSHB	G
Thyrotropin releasing hormone receptor	TRHR	G
Topoisomerase I	•	Ε
Transacylase		Ε
Transferrin	TF	G
Transferrin receptor	TFRC	G
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Transketolase	TKT	Ε
Transketolase-like 1	TKTL1	Ε
Triosephosphate isomerase	TPI1	Ε
Trypsin inhibitor		Ε
Uncoupling protein 1		T
Uroporphyrinogen III synthase	UROS	E
Vasoactive intestinal polypeptide receptor	VIPR	Ν
Vasoinhibitory peptide		G
Vitronectin receptor, alpha	VNRA .	T
Von Hippel-Lindau gene	VHL	G
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	G
Xanthine dehydrogenase	XDH	E

In a eleventh aspect.

INJURY, INFLAMMATION, IMMUNITY AND INFECTION PATENT APPLICATION

The present invention relates to a method of assessing the risk of developing the clinical or social consequences of injury, inflammation, immunity and/or repair and indicating appropriate therapeutic interventions.

Infection and injury are the commonest causes of death in humans under the age of fifty. In a simplistic way both injury and infection can be regarded as events which compromise and destroy the integrity and functionality of tissues, thus leading to debilitating physical states. The human body has evolved a series of physiological responses in order to contain and repair the consequences of injury and infection. These responses are described in the concepts of inflammation, immunity and repair.

Humans are continually exposed to pathogens every minute of the day in the external environment, yet considering the degree of exposure clinical infections are uncommon and death from infection is a relatively rare event. Whilst there is an increasing body of knowledge concerning the genomic structure and physiology of pathogens there is still substantial ignorance concerning the pathophysiology and variability in the individual response to potential pathogens and infection (Weatherall, Leadingham and Warrell et al 1996).

The skin, mucosa and epithelia (e.g. of the gut or urinary tract) provide important physical and biochemical barriers to potential pathogens. Secretion of bactericidal substances (e.g. lysozyme) increase the value of the barrier. As a result damage or injury to the skin surface or to the epithelia lining the gut wall or nasal passages can lead to increased susceptibility to infection.

Association, adhesion and invasion are the key features which characterise the ability of infectious agents to interact with body tissues.

Association – describes the interaction of pathogens with pproteins of the cellular surface or cellular matrix (e.g. CD4 receptor, fibronectin, laminin, collagen).

Adhesion – describes the process whereby pathogen ligands bind to cell surface receptors (usually a glycoprotein or glycolipid e.g. C3 receptor).

Invasion – describes the process (similar to phagocytosis for bacteria) wherby a pathogen is able to crosss the cellular wall and invade the cytoplasm or sub-cellular compartments or nucleus of a cell and disrupt cellular function.

Many pathogens such as bacteria produce toxins which have a deleterious effect on cellular functioning. Such toxins can be categorised as either endotoxins (e.g. lipid A of Gram-negative bacteria) which are released when the cellular structure of the micro-organism is disrupted or exotoxins which are proteinaceous toxins secreted by the pathogen (such as the Shiga toxin of *S. dysenteriae*).

Toxins damage host tissues in a variety of ways, such as the overproduction of inflammatory cytokines (IL-1 and 6 and tumour necrosis factor α by lipid A) or the ADP-ribosylation of G-proteins causing severe dysfunction of membrane enzymes such as adenylate cyclase (by cholera toxin and pertussis toxin).

The destruction of body tissues by injury, pathogens or the release of toxins can lead to a series of physiological changes including, fever, increased basal metabolic rate, increased cardiac output, and changes in plasma proteins. Together these changes have been termed the acute phase reaction and the orchestration of this reaction is achieved by cytokine release from cells of the macrophage/monocyte lineage. Although the symptoms of the acute phase response are unpleasant for the patient there is evidence that they can have a beneficial effect (e.g. the pronounced effect of fever on neurosyphilitic infections, inhibition of bacterial growth by acute phase proteins). However, it is also well documented that an extended acute phase reaction can evolve into a syndrome of septic shock in which excess production of tumour necrosis factor α induces detrimental phenomena such as vascular damage resulting in a fatal clinical condition.

Following the generalised physiological response to pathogens specific cell are recruited to the site of the infection or injury. Polymorphic neutrophil leucocytes are generally the first to be involved in attempts to neutralise pathogens. The are attracted to the relevant sites by chemotactic factors on the pathogens or by complement activation following antibody labelling. Pathogens thus identified are then destroyed by phagocytosis

The complement pathway is a central feature of the protective immune response. The pathway is a complex cascade of proteins which serve to attract white cells to the site of infection and pathogen, facilitate the process of phagocytosis and have a direct effect on pathogens by disrupting their cell walls. The pathway is activated by the presence of immune complexes ('classical' complement pathway), by the presence of microbial products ('alternative' complement pathway) or as a consequence of the digestion of complement component by bacterial proteases. People with deficiencies in proteins which make up the complement cascade are known to have an increased vulnerability to infection.

Specific defences against particular pathogens are the result of the generation of specific antibodies by B and T lymphocytes due to priming by a previous infection or vaccination or to the *de-novo* recognition of pathogen molecules.

Immune system mediated destruction of pathogens is the result of the synergistic action between antibodies and polymorphic neutrophil leukocytes. Destruction of pathogens sheltering within host cells is mediated by sensitised T lymphocytes engaging in direct cytolytic action. Direct contact between effector and target cell is required and the cells must share the same class I histocompatability antigens. Sensitised lymphocytes can also modulate macrophage activity by secreting lymphokines.

The critical role of the immune system in protecting the integrity of the person from infection has been amply demonstrated by examination of the dire consequences which occur when immune function is compromised (e.g. as occurs in acquired immune deficiency syndrome –AIDS). However, the price of efficient immune protection and eradication of pathogens is a degree of destruction of the host tissue.

The destructive side effects of immune system activity can be categorised thus:

Immediate hypersensitivity reactions

Release of histamine and other vasoactive amines from basophils and mast cells that have been sensitised by IgE antibody. Physiological reactions to histamine release can include allergies, rashes, asthma and peripheral circulatory collapse and death.

- Antibody-mediated tissue damage
- Sensitisation of host cells by pathogens may render such cells vulnerable to attack by the immune system such a mechanisms is thought to be involved in auto-immune diseases such as myasthenia gravis, diabetes, some haemolytic anaemias and psoriasis.
- Immune complex mediated tissue damage

Tissue destruction following deposition of immune-complex is a common pathological feature of infection. Immune complexes formed in the circulation can accumulate in organs such as the kidnes, skin, synovium or liver. Localised acute phase responses are triggered and this can lead to tissue damage. Common clinical manifestations of such immune-complex damage are acute glomerulonephritis, chronic glomerulonephritis, arthritis and rashes.

Delayed hypersensitivity reactions

The sensitisation of cells persists and so the potential for immune-related damage continues. This can be particularly marked when patients recover their ability to mount an immune response following a period of decline.

REPAIR FOLLOWING INJURY, INFLAMMATION, INFECTION AND IMMUNE RESPONSE.

Following the elimination of pathogen and immune response-related damage the reparative mechanisms of the body will seek to ameliorate the consequences of tissue loss. The level of inflammation and immune-related activity will be reduced, allowing for the resumption of normal cellular processes and the switching to repair or regenerative modes of activity. Cellular debris will be cleared away and a number of repair mechanisms induced to restore or regain functionality. In many cases this will occur due to the natural rate of cellular re-generation in tissues such as the liver. In other organs where the potential for regeneration is much reduced (e.g. the brain and spinal cord) specific processes such as neurite extension and re-myelination must be initiated by appropriate cells such as glia and controlled by the localised release of appropriate growth factors.

The physiology and control of the body's response to infection and injury is extremely complex and involves the synergistic or inhibitory interaction between multiple regulatory pathways and molecular cascades. Variation in the functionality of the proteins involved in these processes will, inevitably, have an impact on the functioning and success of the patients attempts to minimise cellular damage and

restore function. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from infection and injury including age, sex, nutritional status, pre-existing disease or injury and drug treatments. Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to injury and infection and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at the heart of the difficulties experienced in the healthcare and social management of injury and infection.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

IMMUNITY GENE LIST	HUGO gene symbol	Protein function
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	Ε
Acetylcholinesterase	ACHE	E
Acidic amino acid transporter		T
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Actin, beta	ACTB	S
Actin, gamma 2	ACTG2	S
ADAM (A disintegrin and metalloproteinase) 1	ADAM1	· E
ADAM (A disintegrin and metalloproteinase) 10	ADAM10	Ε
ADAM (A disintegrin and metalloproteinase) 11	ADAM11	Ε
ADAM (A disintegrin and metalloproteinase) 12	ADAM12	E
ADAM (A disintegrin and metalloproteinase) 13	ADAM13	E
ADAM (A disintegrin and metalloproteinase) 14	ADAM14	E
ADAM (A disintegrin and metalloproteinase) 15	ADAM15	Ε
ADAM (A disintegrin and metalloproteinase) 16	ADAM16	E
ADAM (A disintegrin and metalloproteinase) 17		Ε
ADAM (A disintegrin and metalloproteinase) 18		Ē
ADAM (A disintegrin and metalloproteinase) 19	ADAM19	E

ADAM (A disintegrin and metalloproteinase) 2	ADAM2	Ε
ADAM (A disintegrin and metalloproteinase)	ADAM3A	Ε
ADAM (A disintegrin and metalloproteinase)	ADAM3B	_
3B	ADAMOD	E
ADAM (A disintegrin and metalloproteinase) 4	ADAM4	E
ADAM (A disintegrin and metalloproteinase) 5	ADAM5	E
ADAM (A disintegrin and metalloproteinase) 6	ADAM6	E
ADAM (A disintegrin and metalloproteinase) 7	ADAM7	
ADAM (A disintegrin and metalloproteinase) 8	ADAM8	E
ADAM (A disintegrin and metalloproteinase) 9		
Adducin, alpha	ADAM9	E E S
· · · · · · · · · · · · · · · · · · ·	ADD1	S
Adducin, beta	ADD2	S
Adenosine deaminase	ADA	Ε
Adenosine receptor A1	ADORA1	Ν
Adenosine receptor A2A	ADORA2A	Ν
Adenosine receptor A2B	ADORA2B	Ν
Adenosine receptor A3	ADORA3	Ν
Adenylate cyclase 1	ADCY1	E
Adenylate cyclase 2	ADCY2	Ε
Adenylate cyclase 3	ADCY3	E
Adenylate cyclase 4	ADCY4	E
Adenylate cyclase 5	ADCY5	E
Adenylate cyclase 6	ADCY6	E
Adenylate cyclase 7	ADCY7	Ē
Adenylate cyclase 8	ADCY8	Ē
	ADCY9	E
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	
Adrenocorticotrophic hormone (ACTH)	ACTHR	N
receptor	ACTIK	G
Albumin, ALB	ALB	-
Aldosterone receptor	MLR	T
Alpha 1 acid glycoprotein		G
	AAG; AGP	Ţ
Alpha 2 macroglobulin	A2M	<u> </u>
alpha1-antitrypsin	Pl	E
alpha2-antiplasmin	PLI	Ε
Alpha-fetoprotein	AFP	G
alpha-glucosidase, neutral AB	GANAB	E
alpha-glucosidase, neutral C	GANC	Ε
Aminopeptidase P	XPNPEP2	Ε
Amylo-1,6-glucosidase	AGL	E
Amyloid beta A4 precursor protein	APP	Ν
Amyloid beta A4 precursor-like protein	APLP	N
Androgen binding protein	ABP	Τ

Androgen receptor Angiopoietin 1 Angiopoietin 2 Angiotensin converting enzyme Angiotensin receptor 1 Angiotensin receptor 2 Angiotensinogen	AR ANGPT1 ANGPT2 ACE, DCP1 AGTR1 AGTR2 AGT	GGGETTE
Annexin 1 Antidiuretic hormone receptor Anti-Mullerian hormone	ANX 1 ADHR AMH	I T
Antithrombin III Apaf-1	AT3	G E S
Apolipoprotein E Apoptosis antigen 1 Apoptosis antigen ligand 1	APOE APT1 APT1LG1	T ! !
Apoptosis-inducing factor Arginosuccinate lyase Aryl hydrocarbon receptor	AIF ASL AHR	I E T
Asparagine synthetase Aspartylglucosaminidase Ataxia telangiectasia complementation group D	AS AGA ATD ATDC	E E G
Ataxia telangiectasia gene, AT ATP-binding cassette transporter 7 Attractin	ATM ABC7	G
Autoimmune regulator, AIRE B-cell CLL/lymphoma 1	AIRE BCL1	
B-cell CLL/lymphoma 10 B-cell CLL/lymphoma 3 B-cell CLL/lymphoma 4	BCL10 BCL3 BCL4	
B-cell CLL/lymphoma 5 B-cell CLL/lymphoma 6 B-cell CLL/lymphoma 7	BCL5 BCL6 BCL7	
B-cell CLL/lymphoma 8 B-cell CLL/lymphoma 9 BCL2-associated X protein	BCL8 BCL9 BAX	
BCL2-related protein A1 Beckwith-Wiedemann region 1A	BCL2A1 BWR1A	G G
beta 2 microglobulin Bleomycin hydrolase Bloom syndrome protein Bradykinin receptor B1	BLMH BLM	E G I
Bradykinin receptor B2 Brain derived neurotrophic factor Brain derived neurotrophic factor (BDNF) receptor	BDNF BDNFR	I G G
BRCA1-associated RING domain gene 1 Breakpoint cluster region Breast cancer 1	BARD1 BCR BRCA1	G G G

Breast cancer 2	BRCA2	G
Breast cancer, ductal, 1	BRCD1	Ğ
Breast cancer, ductal, 2	BRCD2	G
Butyrylcholinesterase	BCHE	9
C3 convertase	BONE	E
		Ε
Cadherin E	CDH1	G
Cadherin EP		G
Cadherin N	CDH2	G
Cadherin P	CDH3	Ğ
Calbindin 1	CALB1	. G
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	
Calcineurin A2		
	CALNA2	- 1
Calcineurin A3	CALNA3	1
Calcineurin B		- 1
Calcitonin receptor /Calcitonin gene-related	CALCR	Ν
peptide receptor		
Calcitonin/Calcitonin gene-related peptide	CALCA	Ν
alpha	J. 1207.	14
Calcium channel, voltage-dependent, alpha 1F	CACNA1E	N.I
subunit	CACNATE	Ν
	0.000	
Calcium channel, voltage-dependent, Alpha-	CAÇNA1B	Ν
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C	•	
Calcium channel, voltage-dependent, Alpha-	CACNA1D	Ν
1D	•	• •
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)	ONONATE	IN
Calcium channel, voltage-dependent, Alpha-	CACNIAC	N.I
2/delta	CACNA2	Ν
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3	CACNB3	Ν
Calcium channel, voltage-dependent, L type,	CACNA1S	Ν
alpha 1S subunit		
Calcium channel, voltage-dependent,	CACNG2	Ν
Neuronal, Gamma	3. 13.132	•
Calcium channel, voltage-dependent, P/Q	CACNATA	N.I
type, alpha 1A subunit	CACNATA	N
Calcium channel, voltage-dependent, T-type		N
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CAMK2A	Ğ
Calnexin	CANX	G
Calpain	CAPN, CAPN3	E
Calretinin	CALB2	
Canalicular multispecific organic anion		N
Cananodia munispecine organic anion	CMOAT	Т

transporter		
Carbonic anhydrase 3	CA3	Ε
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	
Carbonic anhydrase, beta	CA2	· E
Carboxylesterase 1	CES1	E
Cardiac-specific homeobox, CSX	CSX	G
Cartilage-hair hypoplasia gene	CHH	N
Caspase 1	CASP1	G
Catalase	CAT	I
Cathepsin G	CTSG	Ė
CD1	CD1	L.
CD10	CD10	; 1
CD100	CD100	<u>'</u>
CD101	CD101	ì
CD103	CD103	,
CD106	CD106	i
CD107	CD107	1
CD108	CD108	1
CD109	CD109	i
CD110	CD110	i
CD111	CD111	i
CD112	CD112	i
CD113	CD113	i
CD114	CD114	i
CD115	CD115	i
CD116	CD116	i
CD117	CD117	1
CD118	CD118	1
CD119	CD119	1
CD12	CD12	1
CD120	CD120	1
CD121	CD121	1
CD122	CD122	1
CD123	CD123	1
CD124	CD124	1
CD125	CD125	1
CD126	CD126	$T_{ij} = T_{ij}$
CD127	CD127	1
CD128	CD128	· 1
CD129	CD129	1
CD13	CD13	1
CD130	CD130	1
CD131	CD131	I
CD132	CD132	Į.
CD133	CD133	1
CD134	CD134	I
CD135	CD135	. 1

CD136 CD137 CD138 CD139 CD14 CD140 CD141 CD142 CD143 CD144 CD145 CD145 CD147 CD148 CD149 CD15 CD150 CD151 CD152 CD153 CD154 CD155 CD156 CD157 CD158 CD159 CD160 CD161 CD162 CD163 CD164 CD162 CD163 CD164 CD165 CD166 CD17 CD19 CD2 CD20 CD22 CD23 CD24 CD25 CD26 CD27 CD28 CD3 CD31 CD33 CD34	CD136 CD137 CD138 CD139 CD14 CD140 CD141 CD142 CD143 CD144 CD145 CD147 CD148 CD149 CD15 CD150 CD151 CD152 CD153 CD154 CD155 CD155 CD156 CD157 CD158 CD157 CD158 CD159 CD160 CD157 CD158 CD160 CD161 CD162 CD163 CD164 CD165 CD166 CD17 CD166 CD167 CD166 CD17 CD19 CD2 CD20 CD22 CD20 CD22 CD23 CD24 CD25 CD26 CD27 CD28 CD31 CD33 CD31 CD33 CD34
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0000		
CD36	CD36	ſ
CD37	CD37	
CD38	CD38	1
CD39	CD39	
		1
CD4	CD4	1
CD40	CD40	1
CD41	CD41	1
CD42	CD42	i
CD43	CD43	:
CD44		!
	CD44	1
CD45	CD45	1
CD46	CD46	i
CD47	CD47	1
CD48	CD48	i
CD5	CD5	
CD50	CD50	ſ
CD52	CD52	1
CD53	CD53	į
CD55	CD55	ı
CD57	CD57	i
CD58	CD58	
CD59	CD59	I
CD6	CD6	i
CD60	CD60	1
CD63	CD63	1
CD65	CD65	Ī
CD66	⁻ CD66	i
CD67	CD67	1
CD68		!
	CD68	1
CD69	CD69	i
CD7	CD7	1
CD70	CD70	1
CD71	CD71	
CD72	CD72	i
CD73	CD73	•
CD74	CD74	1
CD75	CD75	
CD76	CD76	" · · · · · · · · · · · · · · · · · · ·
CD77	CD77	1
CD78	CD78	1
CD79	CD79	i
CD8	CD8	i
CD80		1
•	CD80	I
CD81	CD81	
CD83	CD83	Ī
CD84	CD84	1
CD85	CD85	i
CD86	CD86	
	OD00	ı

CD88 CD89 CD9 CD90 CD91 CD92 CD93	CD88 CD89 CD9 CD90 CD91 CD92 CD93	
CD94 CD96	CD94 CD96	
CD97	CD97	i
CD98	CD98	1
CD99	CD99	1
Cell adhesion molecule, intercellular, ICAM Cell adhesion molecule, leukocyte-endothelial,	ICAM1 LECAM1	G
LECAM (CD62)	LECAIVII	G
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	Ğ
Cell adhesion molecule, neural, NCAM2	NCAM2	Ğ
Cell adhesion molecule, platelet-endothelial,	PECAM1	G
PECAM		
Cell adhesion molecule, vascular, VCAM	VCAM1	G
Chediak-Higashi syndrome 1 gene	CHS1	T
Chemokine MCAF	MCAF	I
Chemokine receptor CCR2	CCR2	1
Chemokine receptor CCR3	CCR3	ŀ
Chemokine receptor CCR5 Chemokine receptor CXCR1	CCR5	1
Chemokine receptor CXCR2	CXCR1 CXCR2	- 1
Chemokine receptor CXCR4	CXCR2	1
Cholesterylester hydrolase	CXCIV4	1
Chondritin Sulphate A - placental receptor		i
Chromogranin A	CHGA	Ġ
Chymase	CHY1	
Clathrin		Т
CoA transferase		Ε
Collagen I alpha 1	COL1A1	S
Collagen I alpha 2	COL1A2	S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S S
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	S
Collagen IV alpha 5	COL4A4	S S
Collagen IV alpha 5 Collagen IV alpha 6	COL4A5 COL4A6	ა ი
Collagen IX alpha 2	COL9A2, EDM2	S S
Collagen IX alpha 3	COL9A3	S
and an article of		J

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Collagen receptor	COLR		S
Collagen V alpha 1	COL5A1		Š
Collagen V alpha 2	COL5A2		s
Collagen VI alpha 1	COL6A1		S
Collagen VI alpha 2	COL6A2		\$ \$ \$ \$
Collagen VI alpha 3	COL6A3		9
Collagen VII alpha 1	COL7A1		0
Collagen X alpha 1	COL10A1		S
Collagen X alpha 1	COL11A1		ွ
Collagen XI alpha 2	COL11A1		S S S
Collagen XVII alpha 1	COL17A1		2
Collagenic-like tail subunit of asymmetric			S E
acetylcholinesterase	COLQ		E
•	0054		_
Colony-stimulating factor 1	CSF1		G
Colony-stimulating factor 1 receptor	CSF1R		G
Colony-stimulating factor 2	CSF2		G
Colony-stimulating factor 2 alpha receptor	CSF2RA		G
Colony-stimulating factor 2 beta receptor	CSF2RB	-	G
Colony-stimulating factor 3	CSF3		G
Colony-stimulating factor 3 receptor	CSF3R	-	G
Complement component C1 inhibitor	C1NH		ı
Complement component C1qa	C1QA		ı
Complement component C1qb	C1QB		i
Complement component C1qg	C1QG		ı
Complement component C1r	C1R		1
Complement component C1s	C1S		ı
Complement component C2	-C2		ı
Complement component C3	C3		1
Complement component C4A	C4A		1
Complement component C4B	C4B		1
Complement component C5	C5		1
Complement component C6	C6		1
Complement component C7	C7		1
Complement component C8	C8B		- 1
Complement component C9	·C9		1
Complement component receptor 1	CR1		- 1
Complement component receptor 2	CR2		- 1
Complement component receptor 3	CR3	•	1
Contactin	CNTN1		G
Core-binding factor, alpha 1	CBFA1		G
Core-binding factor, alpha 2	CBFA2		G
Core-binding factor, beta	CBFB		G
Cortico-steroid binding protein			Т
Corticosteroid nuclear receptor			ı
Corticotrophin-releasing hormone	CRH		Ť
Corticotrophin-releasing hormone receptor	CRHR1		Ť
Cortisol receptor			İ
C-reactive protein CRP			i

c-src tyrosine kinase Cyclic AMP response element binding protein Cyclic AMP-dependent protein kinase Cyclic nucleotide phosphodiesterase 1B Cyclic nucleotide phosphodiesterase 1B1 Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4C Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclin D Cyclin-dependent kinase 1 Cyclin-dependent kinase 10 Cyclin-dependent kinase 2 Cyclin-dependent kinase 3 Cyclin-dependent kinase 4 Cyclin-dependent kinase 5 Cyclin-dependent kinase 6 Cyclin-dependent kinase 7	CSK CREB PKA PDE1B PDE1B1 PDE2A3 PDE3A PDE3B PDE4A PDE4C PDE5A PDE6A PDE6B PDE7 PDE8 PDE9A CCND1 CDK1 CDK1 CDK1 CDK1 CDK2 CDK3 CDK4 CDK5 CDK6 CDK5	
•	CDK8 CDK9	G
Cyclin-dependent kinase inhibitor 1A (P21, CIP1)	CDKN1A	G
Cyclin-dependent kinase inhibitor 1B (P27, KIP1)	CDKN1B	G
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN1C	G
Cyclin-dependent kinase inhibitor 2A (p16) Cyclin-dependent kinase inhibitor 3 Cyclooxygenase 1 Cyclooxygenase 2 Cyclophilin CYP11A1	CDKN2A CDKN3 COX1 COX2	GGEET
CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21	

CYP27	CYP27	· E
CYP27B1	PDDR	Ε
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	Ε
CYP2A3	CYP2A3	Ε
CYP2A6V2	CYP2A6V2	Ε
CYP2A7	CYP2A7	Ε
CYP2B6	CYP2B6	Ε
CYP2C18	CYP2C18	Ε
CYP2C19	CYP2C19	Ε
CYP2C8	CYP2C8	Ε
CYP2C9	CYP2C9	Ε
CYP2D6	CYP2D6	E
CYP2E1	CYP2E1	Ε
CYP2F1	CYP2F1	E
CYP2J2	CYP2J2	E
CYP3A3	CYP3A3	Ē
CYP3A4	CYP3A4	Ē
CYP3A5	CYP3A5	Ē
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	Ē
CYP4B1	CYP4B1	Ē
CYP4F2	CYP4F2	Ē
CYP4F3	CYP4F3	Ē
CYP51	CYP51	Ē
CYP5A1	CYP5A1	Ē
CYP7A	CYP7A	Ē
CYP8	CYP8	Ē
Cystathionase	CTH	Ē
Cystathione beta synthase	CBS	Ē
Cystic fibrosis transmembrane conductance	CFTR	N
regulator, CFTR	J	•••
Cytidine deaminase	CDA	E
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytochrome a		Ē
Cytochrome c		Ē
Cytochrome c oxidase, MTCO		Ē
Cytokine-suppressive antiinflammatory drug-	CSBP1	ī
binding protein 1		•
Cytokine-suppressive antiinflammatory drug-	CSBP2	1
binding protein 2	00D. L	•
Defender against cell death 1	DAD1	G
Deleted in colorectal carcinoma	DCC	Ğ
Deoxycorticosterone (DOC) receptor	200	E
Deoxycytidine kinase DCK		E
Dihydrolipoyl dehydrogenase 2	PDHA	E
Dihydrolipoyl transacetylase	PDHA	E
Dopamine receptors D1	DRD1	N
Dopanino rocoptoro D I		1.4

Dopamine receptors D2 Dopamine receptors D3 Dopamine receptors D4 Dopamine receptors D5 Duffy blood group Dynamin EB1	DRD2 DRD3 DRD4 DRD5 FY DNM1	N N N T G G
Elastase 1 Elastase 2 Endoglin Endo-P-D-glucuronidase	ELAS1 ELAS2 ENG	BES-
Enolase Erythroid kruppel-like factor Erythropoietin Erythropoietin receptor Estrogen receptor	ENO1 EKLF EPO EPOR	 E G I
EWS RNA-binding protein Factor 1 (No. one) Factor B, properdin Factor D	ESR EWSR1 F1	GGII
Factor H Factor I (letter I) Factor IX	HF1 IF F3 F9	1
Factor V Factor VII Factor VIII Factor X Factor XI	F5 F7 F8 F10 F11	
Factor XII Factor XIII A & B Fanconi anemia, complementation group C Fanconi anemia, complementation group D	F12 F13A & F13B FANCC FANCD	• T
Fc fragment of IgG, low affinity Ila, receptor for (CD32) Fc receptor	FCGR2A	G I
Fibrinogen alpha Fibrinogen beta Fibrinogen gamma Fibronectin precursor Follicle stimulating hormone receptor Follicle stimulating hormone, FSH Follicular lymphoma variant translocation 1 Forkhead rhabdomyosarcoma gene Forkhead transcription factor 7 Galactosyltransferase 1	FGA FGB FGG FN1 FSHR, ODG1 FSHB FVT1 FKHR FKHL7 GT1	888666-666
Galactosyltransferase, alpha 1,3 Galactosyltransferase, beta 3	GGTA1 B3GALT	G G

Glial-cell derived neurotrophic factor (GDNF) receptor		N
Glial-cell derived neurotrophic factor, GDNF	GDNF	A.I
Glucosaminyl (N-acetyl) transferase 2, i-	GCNT2	Й
branching enzyme	001112	E
Glutamate receptor 1	GLUR1	N I
Glutamate receptor 2	GLUR2	N
Glutamate receptor 3	GLUR3	N
Glutamate receptor 4	GLUR4	N
Glutamate receptor 5	GLUR5	N N
Glutamate receptor 6	GLUR6	N
Glutamate receptor 7	GLUR7	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
Glutamine synthase		Ë
Glutathione	GSH	T
Glutathione peroxidase, GPX1	GPX1	Ė
Glutathione peroxidase, GPX2	GPX2	Ē
Glutathione S-transferase mu 1, GSTM1	GSTM1	E
Glutathione S-transferase mu 4, GSTM4		Ē
Glutathione S-transferase, GSTZ1	GSTZ1	Ē
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	E
GAPDH	·	
Glycerol kinase	GK	Ε
Glycinamide ribonucleotide (GAR)	GART	E
transformylase		
Glycophorin A	GYPA	S
Glycophorin B	GYPB .	S
Glycophorin C	GYPC	S
Glycosyltransferases, ABO blood group	ABO	Ε
Glypican 3	GPC3, SDYS	G
Gonadotropin releasing hormone receptor	GNRHR	G
Growth-regulated protein precursor, GRO	GRO	1
Guanine nucleotide-binding protein, alpha	GNAI1	Ν
inhibiting activity polypeptide 1, GNAI1	* * *	
Guanine nucleotide-binding protein, alpha	GNAI2	Ν
inhibiting activity polypeptide 2, GNAI2		
Guanine nucleotide-binding protein, alpha	GNAI3	Ν
inhibiting activity polypeptide 3, GNAI3		
Guanine nucleotide-binding protein, alpha	GNAS1	Ν
stimulating activity polypeptide, GNAS1		
Guanine nucleotide-binding protein, alpha	GNAS2	N
stimulating activity polypeptide, GNAS2	01400	
Guanine nucleotide-binding protein, alpha	GNAS3	N
stimulating activity polypeptide, GNAS3		

Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	N
Guanine nucleotide-binding protein, q polypeptide	ĠNAQ	N
H(+), K(+) - ATPase	ATP4B	N
Haemoglobin alpha 1	HBA1	T
Haemoglobin alpha 2	HBA2	Ť
Haemoglobin beta	HBB	T
Haemoglobin delta	HBD	
Haemoglobin gamma A	HBG1	T
Haemoglobin gamma B	HBG2	. T
	HBGG	Ť
Haemoglobin gamma G		1
Haptoglobin, alpha 1	HPA1	
Haptoglobin, alpha 2	HPA2	1
Haptoglobin, beta	HPB	1 T
Hemochromatosis	HFE	T
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	!
Hepatitis B virus integration site 1	HVBS1	1
Hepatitis B virus integration site 2	HVBS6	1
High mobility group protein C	HMGIC	G
High mobility group protein Y	HMGIY	G
Histamine receptors, H1		N
Histamine receptors, H2		N
Histamine receptors, H3		Ņ
Histatin 1		- !
Histatin 2	LITAIO	l 1
Histatin 3	HTN3	
HLA-B associated transcript 1	BAT1	!
Holocarboxylase synthetase	HLCS	E
Homeobox 11	HOX11	G
Homeobox HB24	HLX1	G
IC7 A and B	IKAROS	l G
Ikaros gene		G
Immunoglobulin alpha (IgA)	IGHA IGHD	1
Immunoglobulin delta (IgD)	IGER	l I
Immunoglobulin E (IgE) reponsiveness gene		- 1
Immunoglobulin E (IgE) serum concentration	IGES	J
regulator gene	ICHE	1
Immunoglobulin epsilon (IgE)	IGHE IGHG2	1
Immunoglobulin gamma (IgG) 2	–	,
Immunoglobulin heavy mu chain	IGHM	1
Immunoglobulin J polypeptide	IGJ) 1
Immunoglobulin kappa constant region	IGKC	1
Immunoglobulin kappa variable region	IGKV	1
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2	IGF2	G

IGF2R	G
ITGB1	G
ITGB2	G
ITGB3	G
ITGB4	G
ITGB5	G
ITGB6	G
ITGB7	G
ITGA1	Ğ
ITGA2	G
ITGA4	G
ITGA5	G
ITGA6	G
ITGAM	Ğ
ICAM1	Ī
ICAM2	i
ICAM3	Ī
IFNA1	Ì
IFNB	Ì
IFNG	ĺ
IFNGR1	I
IFNGR2	i
IRF1	ı
IRF4	ı
IL1R	I
IL1A	1
IL1B	1
IL10	1
IL10R	1
IL11	1
IL11R	1
IL12	1
IL12RB1	1
IL13	1
IL13R	1
IL2	1
IL2RA	1
IL2RG	1.
IL3	1
IL3R	1
IL4	
IL4R	1
IL5	ı
IL5R	1
IL6	1
IL6R	1
IL7	1
IL7R	1
	ITGB1 ITGB2 ITGB3 ITGB4 ITGB5 ITGB6 ITGB7 ITGA1 ITGA2 ITGA4 ITGA5 ITGA6 ITGAM ICAM1 ICAM2 ICAM3 IFNA1 IFNB IFNG IFNGR1 IFNGR2 IRF1 IRF4 IL1R IL1A IL1B IL10 IL10R IL11 IL11R IL12 IL12RB1 IL13 IL13R IL2 IL2RA IL2RG IL3 IL3R IL4 IL4R IL5 IL5R IL6 IL6R IL7

Interleukin(IL) 8	IL8	ı
Interleukin(IL) 8 receptor	IL8R	i
Interleukin(IL) 9	IL9	-
Interleukin(IL) 9 receptor	IL9R	1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	
Janus kinase 1	JAK1	ı
Janus kinase 2	JAK2	G
Janus kinase 3	JAK3	G
Kallikrein 3	KAK3	G
Kell blood group precursor	· -	1
	XK, KEL	Т
Kininogen, High molecular weight	KNG	1
Kynureninease		E
Lactotransferrin	LTF	Т
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	· G
Latent transforming growth factor-beta binding	LTBP2	G
protein 2		
Lectin, mannose-binding 1	LMAN1	1
Lectin, mannose-binding 2	MBL2	, i
Leptin	LEP	Ġ
Leptin receptor	LEPR	Ğ
Leukaemia inhibitory factor	LIF	Ğ
Leukaemia inhibitory factor receptor	LIFR	Ğ
Leukin		Ĭ
Leukocyte-specific transcript 1	LST-1	i
Leukotriene A4 hydrolase		i
Leukotriene A4 synthase	LTA4S	Ė
Leukotriene B4 receptor	217110	1
Leukotriene B4 synthase	LTB4S	Ė
Leukotriene C4 receptor	E1040	
Leukotriene C4 synthase	LTC4S	
Leukotriene D4/E4 receptor	L1043	E
LIM homeobox protein 1	LHX1	1
LIM homeobox protein 2		G
LIM homeobox protein 3	LHX2	G
LIM homeobox protein 4	LHX3	J
	LHX4	G
LIM-domain only protein 1	LMO1	G
LIM-domain only protein 2	LMO2	G
LIM-domain only protein 3	LMO3	G.
LIM-domain only protein 4	LMO4	G
LIM-Kinase I (LINK-I)		1
Lipocortin 1	ANX4	I
Lipoprotein-associated coagulation factor	LACI	1
Lipoxygenase 12 (platelets)	LOG12	1
Lipoxygenase 5 (leukocytes)		1

Lymphoblastic leukemia derived sequence 1	LYL1	1
Lymphocyte-specific protein tyrosine kinase	LCK	1
Lymphoid enhancer-binding factor	LEF-1	G
lymphotoxin		Ī
Lysozyme	LYZ	i
Macrophage activating factor	MAF	i
Macrophage inflammatory protein-1	MIP1	i
Macrophage inflammatory protein-1 receptor		i
Macrophage inflammatory protein-2	MIP2	i
Macrophage inflammatory protein-2 receptor	<u>-</u>	i
MAD (mothers against decapentaplegic,	MADH3	G
Drosophila) homologue 3		. •
MAD (mothers against decapentaplegic,	MADH4	G
Drosophila) homologue 4		J
Malignant proliferation, eosinophil gene	MPE	ı
Mannose binding protein	MBP	i
Mannosidase, alpha B lysosomal	MANB	Ė
Marenostrin	MEFV	Ť
Matrix metalloproteinase 1	MMP1	Ė
Matrix metalloproteinase 10	MMP10	Ē
Matrix metalloproteinase 11	MMP11	Ē
Matrix metalloproteinase 12	MMP12	Ē
Matrix metalloproteinase 13	MMP13	Ē
Matrix metalloproteinase 14	MMP14	Ē
Matrix metalloproteinase 15	MMP15	Ē
Matrix metalloproteinase 16	MMP16	Ē
Matrix metalloproteinase 17	⁻ MMP17	E
Matrix metalloproteinase 18	MMP18	E
Matrix metalloproteinase 19	MMP19	E
Matrix metalloproteinase 2	MMP2	Ε
Matrix metalloproteinase 3	MMP3, STMY1	Ε
Matrix metalloproteinase 4	MMP4	Ε
Matrix metalloproteinase 5	MMP5	E
Matrix metalloproteinase 6	MMP6	Ε
Matrix metalloproteinase 7	MMP7	Е
Matrix metalloproteinase 8	MMP8	Ε
Matrix metalloproteinase 9	MMP9	Ε
MHC Class I: A	*	· 1
MHC Class I: B		ĺ
MHC Class I: C		1
MHC Class I: LMP-2, LMP-7		1
MHC Class I: Tap1	ABCR, TAP1	ı
MHC Class II: DP	HLA-DPB1	- 1
MHC Class II: DQ		1
MHC Class II: DR		1
MHC Class II: Tap2	TAP2, PSF2	İ
MHC Class II:Complementation group A	MHC2TA	ŀ
MHC Class II:Complementation group B	rfxank	1

MHC Class II:Complementation group C	RFX5	1
MHC Class II:Complementation group D	RFXAP	1
Monocyte chemoattractant protein 1	MCP1	1
Mucin 18	MUC18	T
Mutated in colorectal cancers, MCC	MCC	G
MutL homolog 1	MLH1	Ğ
MutS homolog 2	MSH2	Ğ
MutS homolog 3	MSH3	Ğ
Myeloid leukemia factor-1	MLF1	ì
Myeloperoxidase	MPO	i
Myoglobin		Ť
Myosin 5A	MYO5A	s
N-acyl hydrolase	WITOSA	j
NADPH oxidase		i
NADPH-dependent cytochrome P450	POR	Ė
reductase) OIX	-
Natural resistance-associated macrophage	NRAMP1	1
protein 1	1110 11111	•
NB6	•	ı
Nerve growth factor	NGF	Ġ
Nerve growth factor receptor	NGFR	G
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	'NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Neutral endopeptidase	(4) 121(E
Neutrophil cystolic factor 1	NCF1	ī
Neutrophil cystolic factor 2	NCF2	i
Nitric oxide synthase 1, NOS1	NOS1	Ė
Nitric oxide synthase 1, NOS2	NOS2	Ē
Nitric oxide synthase 3, NOS3	NOS3	Ē
Norrie disease protein	NDP	G
Notch 3	NOTCH3	G
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL	-1
Nuclear factor kappa beta	NFKB	i
·	NFATC	Ġ
Nuclear factor of activated T cells (NFAT)	NEATC	J
complex, cytosolic	NFATP	G
Nuclear factor of activated T cells (NFAT)	NEATE	G
complex, preexisting component	NDDKA	=
Nucleoside diphosphate kinase-A	NDPKA	E
Oncogene bcl2	ELV1	G
Oncogene ELK1	ELK1	G
Oncogene ELK2	ELK2	G
Oncogene ERG (early reponse gene)		G

Oncogene GLI1 Oncogene GLI2 Oncogene GLI3 Oncogene spi1 Oncogene TEL Oncostatin M Oncostatin M receptor Ornithine delta-aminotransferase Osteonectin Osteopontin Paired box homeotic gene 3 Paired box homeotic gene 7 Patched (Drosophila) homolog, PTCH Peanut-like 1 Phagocytin Phenylethanolamine N-methyltransferase,	GLI GLI2 GLI3 ETV6 OSM OSMR OAT ON OPN PAX3 PAX7 PTCH PNUTL1	000000000000000u
PNMT	LIMINI	E
Phosphatidylinositol glycan, class A	PIGA	G
(paroxysmal nocturnal hemoglobinuria) Phospholipase A2, group 10 Phospholipase A2, group 1B Phospholipase A2, group 2A Phospholipase A2, group 2B Phospholipase A2, group 4A Phospholipase A2, group 4C Phospholipase A2, group 5	PLA2G10 PLA2G1B PLA2G2A PLA2G2B PLA2G4A PLA2G4C PLA2G5	
Phospholipase A2, group 5 Phospholipase A2, group 6 Phospholipase C alpha Phospholipase C beta	PLA2G6	
Phospholipase C delta Phospholipase C epsilon	PLCD1	[
Phospholipase C gamma Phosphomannomutase-2 Plakophilin 1	PLCG1 PMM2 PKP1	T T
Plasminogen	PLG	E
Plasminogen activator inhibitor 1 Plasminogen activator inhibitor 2	PAI1 PAI2	E
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue Plasminogen activator, Urokinase Platelet glycoprotein 1b, alpha	PLAT; TPA UPA; PLAU GP1BA	E
Platelet glycoprotein 1b, beta	GP1BB	i
Platelet glycoprotein 1b, gamma	GP1BG	- 1
Platelet glycoprotein IX	GP9	!
Platelet glycoprotein V	GP5	!
Platelet-activating factor acetylhydrolase 1B	PAFAH1B1 or LIS1	l I
Platelet-activating factor acetylhydrolase 2 Platelet-activating factor receptor	PAFAH2 PAFR	1

Poliovirus receptor	PVR, PVS	
Potassium channel, calcium-activated,	KCNN4	N
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1	
Potassium voltage-gated channel E1	KCNE1	N
		N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3 Prekallikrein	KCNQ3	N
	DENIZ	1
Preproenkephalin	PENK	N
Procollagen N-protease	Divi	E
Promyelocytic leukemia gene	PML	G
Proopiomelanocortin	POMC	Ň
Properdin P factor, complement	PFC, PFD	ŀ
Prostacyclin synthase		1
Prostaglandin (PG) D synthase, hematopoietic		E
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	1
Prostaglandin D - DP receptor		. 1
Prostaglandin E1 receptor		1
Prostaglandin E2 receptor		1
Prostaglandin E3 receptor	•	i
Prostaglandin F - FP receptor	,	i
Prostaglandin I2 receptor		T
Prostaglandin IP receptor		i
Prostaglandin isomerase		G
Prostaglandin-endoperoxidase synthase 2	PTGS2	G
Protease inhibitor 1		T
Protein C	PROC	1
Protein C inhibitor	PCI	1
Protein kinase A		E
Protein kinase C, alpha	PRKCA	Ε
Protein kinase C, gamma	PRKCG	Ε
Protein kinase DNA-activated	PRKDC	Ε
Protein kinase G		Ε
Protein phosphatase 1, regulatory (inhibitor)	PPP1R3	E
subunit 3		
Protein phosphatase 2, regulatory subunit A,	PPP2R1B	· E
beta isoform		
Protein S	PROS1	ı
Protein tyrosine phosphatase, non-receptor	PTPN12	G
type 12		
Proteinase 3		1
Prothrombin precursor	F2	Į
Purine nucleoside phosphorylase	NP	Ė
Pyruvate decarboxylase	PDHA	Ē
Retinoblastoma 1	RB1	Ğ
Retinol binding protein 4	RBP4	Ť
J ,	· / ·	•

Rhesus blood group, CcEe antigens Rhesus blood group, D antigen Rhesus blood group-associated glycoprotein Ribosomal protein S19 RIGUI S100 calcium-binding protein A1 S100 calcium-binding protein A2 S100 calcium-binding protein A3 S100 calcium-binding protein A4 S100 calcium-binding protein A5 S100 calcium-binding protein A6 S100 calcium-binding protein A7 S100 calcium-binding protein A8	RHCE RHD RHAG RPS19 RIGUI S100A1 S100A2 S100A3 S100A4 S100A5 S100A6 S100A7	T T T E G N N N N N N N N N N N N N N N N N N
S100 calcium-binding protein A9 S100 calcium-binding protein B	S100A9 S100B	N N
S100 calcium-binding protein P	S100P	N
SAP (SLAM-associated protein)	SH2D1A	ì
Selectin E	SELE	N
Selectin L	SELL	N
Selectin P	SELP	N
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	Ν
Serotonin receptor, 5HT2A	HTR2A	Ν
Serotonin receptor, 5HT2B	HTR2B	Ν
Serotonin receptor, 5HT2C	HTR2C	Ν
Serotonin receptor, 5HT3	HTR3	Ν
Serotonin receptor, 5HT4	HTR4	Ν
Serotonin receptor, 5HT5	HTR5	Ν
Serotonin receptor, 5HT6	HTR6	Ν
Serotonin receptor, 5HT7	HTR7	Ν
Severe combined immunodeficiency, type A	SCIDA	-1
(Athabascan)		
Signal transducer and activator of transcription	STAT1	G
Signal transducer and activator of transcription	STAT2	G
2 Signal transducer and activator of transcription 3	STAT3	G
Signal transducer and activator of transcription	STAT4	G
Signal transducer and activator of transcription 5	STAT5	G
Signaling lymphocyte activation molecule Sine oculis homeobox, drosophila, homolog 1	SLAM SIX1	I G

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Cine paulie hamania and a transport		
Sine oculis homeobox, drosophila, homolog 2	SIX2	G
Sjoegren (Sjogren) syndrome antigen A1	SSA1	-
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma		N
Sodium channel, voltage gated, type V, alpha	SCN5A	N
polypeptide	00/10/1	14
Sodium channel, voltage-gated, type 1, beta	SCN1B	
polypeptide	SCNIB	Ν
Solute carrier family 19 (folate transporter), member 1	SLC19A1	T
		•
Solute carrier family 20, member 1	SLC20A1	T
Solute carrier family 20, member 2	SLC20A2	T
Solute carrier family 5 (sodium/glucose	SLC5A1	T
transporter), member 1		
Solute carrier family 5 (sodium/glucose	SLC5A2	T
transporter), member 2		•
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5		•
	SLC5A3	Т
	SRI	†
		G
		G
		G
		G
		Ε
Succinate thiokinase		Ε
<u> </u>		Ε
	SOD3	Ę
	SRK ·-	i
	TLN	G
Talin, TLN		S
T-cell acute lymphocytic leukemia 1	TAL1	ı
T-cell acute lymphocytic leukemia 2	TAL2	i
Aura	TCRA	i
—	TCRD	i
Tenascin (cytotactin)		s
		S S
	TDT	ာ ၊
Terminal deoxynucleotidyltransferase, TDT	•	_
		E
	F2R	l
(20)		G
		G
	TBXAS1	1
	TXA2	1
	TBXA2R	١.
	THY1	1
Thymic humoral factor		١

Thymopoietin	TMPO	G
Thymosin		1
TIE receptor tyrosine kinase	TIE-1	G
Tip-associated protein	TAP	-
Toll-like receptor 4	TLR4	1
Topoisomerase I		Ε
Topoisomerase II		Ε
Transcobalamin 2, TCN2	TCN2	Т
Transcription factor 3	TCF3	G
Transcription factor binding to IGHM enhancer	TFE3	Ğ
3		
Transferrin	TF	G
Transferrin receptor	TFRC	Ğ
Transforming growth factor, alpha	TGFA	Ğ
Transforming growth factor, beta 2	TGFB2	Ğ
Transforming growth factor, beta induced	TGFBI	Ğ
Transforming growth factor, beta receptor 2	TGFBR2	Ğ
Tuberous sclerosis 1	TSC1	Ğ
Tuberous sclerosis 2	TSC2	Ğ
Tubulin		s
Tumor susceptibility gene 101	TSG101	G
Tumour necrosis factor (TNF) receptor	TRAF1	Ĭ
associated factor 1		•
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		•
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3	-	•
Tumour necrosis factor (TNF) receptor	TRAF4	ı
associated factor 4		•
Tumour necrosis factor (TNF) receptor	TRAF5	1
associated factor 5		•
Tumour necrosis factor (TNF) receptor	TRAF6	1
associated factor 6		•
Tumour necrosis factor alpha	TNFA	ı
Tumour necrosis factor alpha receptor	TNFAR	i
Tumour necrosis factor beta	TNFB	i
Tumour necrosis factor beta receptor	TNFBR	i
Tumour protein p53	TP53, P53	Ġ
Tumour protein p63	TP63	Ğ
Tumour protein p73	TP73	Ğ
Tumour protein, translationally-controlled 1	TPT1	Ğ
Tumour suppresssor gene DRA	DRA	ĭ
Ubiquitin	DICA	Ġ
Ubiquitin activating enzyme, E1		E
Ubiquitin B	UBB	G
Ubiquitin Ć	UBC	G
Ubiquitin C Ubiquitin fusion degeneration 1-like	UFD1L	
•		G E
Ubiquitin protein ligase E3A	UBE3A	

1

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Undulin 1	COL14A1	S
Uridine monophosphate kinase	UMPK	1
Uridine monophosphate synthetase	UMPS	1
Uroporphyrinogen III synthase	UROS	Е
Vimentin	VIM	1
v-myc avian myelocytomatosis viral oncogene	MYC	G
homolog		
Von Hippel-Lindau gene	VHL	G
Werner syndrome helicase	WRN	G
Wilms tumour gene 1	WT1	G
Wilms tumour gene 2	WT2	Ġ
Wilms tumour gene 4	WT4	G
Winged helix nude	WHN	G
Wiskott-Aldrich syndrome protein	WASP, THC	1
Xanthine dehydrogenase	XDH	E
X-ray repair gene	XRCC9	G
Zinc finger protein 198	ZIC198	S
Zinc finger protein HRX	ALL1	1

In a twelfth aspect.

DEVELOPMENT

The present invention relates to a method of assessing the risk of developing clinical or social consequences following dysfunction, damage or disease of the body consequent to an aberration in the processes of development and indicating appropriate therapeutic interventions.

The process by which fertilisation of an egg leads to the formation and growth of a foetus, birth of a baby and the maturation of an adolescent into an adult are collectively described as development. An understanding of the genetic and molecular events directing the development and differentiation of cells into tissues and organs is slowly being understood (Gilbert 1997). The intricate nature of the interactions between cells as they divide and differentiate is mediated by a host of regulatory systems including:

DNA methylation

Transcriptional regulation (e.g POU transcription factors)

Differential RNA splicing

Paracrine systems

Signal transduction pathways (e.g. RTK-Ras, JAK-STAT, NOTCH)

Neurotransmitter/receptor interaction

Cell surface adhesion molecules

In addition there are significant interactions between the developing organism and the environment (the womb and subsequently the external environment). In humans the process of development and maturation continues through to late 20's as the final stages of brain myelination occur.

The sheer complexity of these interactions and their subtle effects on the dynamics of organ formation and development mean that there are multiple opportunities for perturbation, failure or premature termination of the developmental trajectory. No tissue, organ or organ system in the body is immune to the possibility of dysfunction, damage or disease consequent to an aberration in the processes of development.

The spectrum of medical, psychological and social consequences consequent to an aberration in developmental processes is enormous (Weatherall, Leadingham and Warrell 1996). For example abnormalities of brain development are very frequent and often lead to lasting impairments in cognition and learning (some 3% of school leavers may have some degree of neurological impairment. Developmental disorders include:

Down's syndrome (brain and other organs)

Cruzon syndrome (skull)

Congenital adrenal hyperplasia (endocrine system)

Congenital hypothroidism (endocrine system)

Hirchsprung's disease (gastrointestinal system)

Pyloric stenosis (gastrointestinal system)

Aortic-valve stenosis (cardiovascular system)

Mitral valve abnormalities (cardiovascular system)

Spina bifida (spine)

Cerebral palsy (central nervous system)

Cystic fibrosis (respiratory system)

The physiology and nature of dysfunction, damage or disease of the body consequent to an aberration in the processes of development are extremely complex. The exact spectrum of symptoms and attendant disability are derived from the nature of the lesion, its site and extent and the time at which it influenced the pattern of development. The presence of a clinical, psychological or social liability may also change over time since the manifestations of the difficulties at birth, adolescence or adulthood will alter as a function of the unfolding of development

The interactions between the various proteins which form the constituent parts of the regulatory systems are critical in the control and modulation of development. Variation in the functionality of the proteins involved in these processes will, inevitably, cause or have an impact on the functioning of these systems or modulate a tissues ability to minimise developmental aberrations and restore function following dysfunction, damage or disease in the development of these systems. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from dysfunction, damage or disease of the body consequent to an aberration in the processes of development. These include genetic history, age, sex, nutritional status, pre-existing disease or injury, drug treatments and socio-economic circumstances.

Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to the occurrence of dysfunction, damage or disease of the body consequent to an aberration in the processes of development and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at the heart of the difficulties experienced in the health and social management of dysfunction, damage or disease of the body consequent to an aberration in the processes of development.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

DEVELOPMENT GENE LIST	HUGO gene symbol	Protein function
17-ketosteroid reductase		· N
2,4-dienoyl CoA reductase	DECR	Ε
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	E
3-oxoacid CoA transferase	OXCT	E
6-pyruvoyltetrahydropterin synthase	PTS	Ē
Absent in melanoma 1 gene	AIM1	G
Acetoacetyl 2-CoA-thiolase	ACAT2	. E
Acetyl CoA acyltransferase	ACAA	Ē
Acetyl CoA carboxylase alpha	ACACA	Ē
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	Ň
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N N
Acetylcholine receptor, nicotinic, gamma	CHRNG	· N
Acetylcholinesterase	ACHE	Ë
Achromatopsia 2	ACHM2	S
Acid phosphatase 2, lysosomal	ACP2	Ĕ
Acrosin	ACR	Ğ
Actin, alpha, cardiac	ACTC	- · · · · S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Activin		Ğ
Activin A receptor, type 2B	ACVR2B	Ğ
Activin A receptor, type 2-like kinase 1	ACVRL1	Ğ
Acyl CoA dehydrogenase, short chain	ACADS	Ē
Acyl-CoA thioesterase		Ē
ADAM (A disintegrin and metalloproteinase) 1	ADAM1	Ē
ADAM (A disintegrin and metalloproteinase) 10		Ē
ADAM (A disintegrin and metalloproteinase) 11		Ē

ADAM (A disintegrin and metalloproteinase) 12	2 ADAM12	Ε
ADAM (A disintegrin and metalloproteinase) 13	3 ADAM13	E
ADAM (A disintegrin and metalloproteinase) 14	1 ADAM14	E
ADAM (A disintegrin and metalloproteinase) 15	5 ADAM15	E
ADAM (A disintegrin and metalloproteinase) 16	S ADAM16	
ADAM (A disintegrin and metalloproteinase) 17	7 ADAM17	Ε
ADAM (A disintegrin and metalloproteinase) 18		E
ADAM (A disintegrin and metalloproteinase) 19) ADAM10	E
ADAM (A disintegrin and metalloproteinase) 2	ADAMO	E
ADAM (A disintegrin and metalloproteinase)		E
3A	ADAM3A	E
ADAM (A disintegrin and metalloproteinase)	ADAMAD	_
3B	ADAM3B	Ε
ADAM (A disintegrin and metalloproteinase) 4	AD ANA	
ADAM (A disintegrin and metalloproteinase) 4 ADAM (A disintegrin and metalloproteinase) 5	ADAM4	E
	ADAM5	E
ADAM (A disintegrin and metalloproteinase) 6	ADAM6	Ε
ADAM (A disintegrin and metalloproteinase) 7	ADAM7	Ε
ADAM (A disintegrin and metalloproteinase) 8	ADAM8	E
ADAM (A disintegrin and metalloproteinase) 9	ADAM9	Ε
Adducin, alpha	ADD1	S
Adducin, beta	ADD2	S
Adenomatous polyposis coli tumour supressor	APC	G
gene Adenosine deaminase	454	_
	ADA .	E
Adenosine monophosphate deaminase	AMPD	Ε
Adenosine receptor A1	ADORA1	N
	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adend system	ADORA3	N
Adenyl cyclase		N
Adenylate cyclase 1	ADCY1	Ε
Adenylate cyclase 2	ADCY2	Ε
Adenylate cyclase 3	ADCY3	Ε
Adenylate cyclase 4	ADCY4	Ε
Adenylate cyclase 5	ADCY5	Ε
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	E
Adenylate cyclase 8	ADCY8	Ε
Adenylate cyclase 9	ADCY9	Ε
Adenylosuccinate lyase	ADSL	Е
ADP-ribosyltransferase	ADPRT	E
Adrenergic receptor, alpha1	ADRA1	Ν
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
	ADRB3	N
Adrenocorticotrophic hormone (ACTH)	ACTHR	G
receptor		

Adrenoleukodystrophy gene Alanine-glyoxylate aminotransferase Albumin, ALB Aldehyde dehydrogenase 1 Aldehyde dehydrogenase 2 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 7 Aldolase A Aldolase B Aldolase C Aldosterone receptor Alkaline phosphatase, liver/bone/kidney Alkaptonuria gene	ALD AGXT ALB ALDH10 ALDH10 ALDH5 ALDH6 ALDH7 ALDOA ALDOB ALDOC MLR ALPL AKU	
Alkylglycerone phosphate synthase Alpha 2 macroglobulin	AGPS A2M	E
alpha tectorin	TECTA	G
alpha thalassemia gene	ATRX	Ν
alpha1-antitrypsin	PI	Ε
alpha2-antiplasmin	PLI	E
alpha-actinin 2	ACTN2	G
alpha-actinin 3	ACTN3	G
alpha-amylase		Ε
Alpha-fetoprotein	AFP	G
alpha-Galactosidase A	GLA	E
alpha-ketoglutarate dehydrogenase		E
alpha-L-Iduronidase	IDUA	Ε
alpha-synuclein	SNCA	N
Amelogenin	AMELX	S
Aminomethyltransferase	AMT	E
Aminopeptidase P	XPNPEP2	E
Amphiregulin	AREG	G
Amylo-1,6-glucosidase	AGL	E
Amyloid beta (A4) precursor protein-binding, APBB1	APBB1	N
Amyloid beta A4 precursor protein	APP	N
Amyloid beta A4 precursor-like protein	APLP	N
Androgen binding protein	ABP	T
Androgen receptor	AR	G
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G.
Angiotensin converting enzyme	ACE, DCP1	Ē
Angiotensinogen	AGT	E
Ankyrin 1	ANK1	S
Ankyrin 2	ANK2	S
Ankyrin 3	ANK3	S
Antidiuretic hormone receptor	ADHR	Т

Anti-Mullerian hormone	AMH		G
Anti-Mullerian hormone type 2 receptor	AMHR2		G
Antithrombin III	AT3		E
AP-2, alpha	TFAP2A		Ğ
AP-2, beta	TFAP2B		Ğ
AP-2, gamma	TFAP2C		G
Apaf-1			S
Apical protein, xenopus laevis-like	APXL		G
Apolipoprotein A 4	APOA4		T
Apolipoprotein A I	APOA1		Ť
Apolipoprotein A II	APOA2	•	Ť
Apolipoprotein B	APOB		Ť
Apolipoprotein C1	APOC1		Ť
Apolipoprotein C2	APOC2		Ť
Apolipoprotein C3	APOC3		Ť
Apolipoprotein D	APOD		Ť
Apolipoprotein E	APOE		Ť
Apolipoprotein H	APOH		Ť
Apopain	CPP32		Ġ
Apoptosis antigen 1	APT1		Ī
Apoptosis antigen ligand 1	APT1LG1		i
Apoptosis-inducing factor	AIF		i
Apurinic endonuclease	APE		Ē
Archaete-scute homolog 1	ASH1		Ğ
Archaete-scute homolog 2	ASH2		G
Arginosuccinate synthetase	ASS		Ē
Arrestin	SAG		S
Aryl hydrocarbon receptor	AHR		T
Aryl hydrocarbon receptor nuclear translocator	ARNT		Т
Arylsulfatase A	ARSA		E
Arylsulfatase B	ARSB		E
Arylsulfatase C	ARSC1		E
Arylsulfatase D	ARSD		E
Arylsulfatase E	ARSE		E
Arylsulfatase F	ARSF		Ε
Aspartate transaminase			T
Aspartate transcarbamoylase			E
	ASPA		E.
Aspartylglucosaminidase	AGA		Ε
Astrotactin	ASTN		G
Ataxia telangiectasia complementation group D	ATD, ATDC		G
Ataxia telangiectasia gene, AT	ATM		G
Ataxin 1	SCA1		G
Ataxin 2	SCA2		G
Ataxin 3	MJD		Ğ
ATP-binding cassette transporter 7	ABC7	4	ĺ
Atrial natriuretic peptide	ANP		Ġ
Atrial natriuretic peptide receptor A	NPR1		Ğ

Atrial natriuretic peptide receptor B Atrial natriuretic peptide receptor C Atrophin 1 Attractin	NPR2 NPR3 DRPLA	G G I
Autoimmune regulator, AIRE	AIRE	i
Azoospermia factor 1	AZF1	G
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	Ğ
B-cell CLL/lymphoma 1	BCL1	Ī
B-cell CLL/lymphoma 10	BCL10	i
B-cell CLL/lymphoma 3	BCL3	i
B-cell CLL/lymphoma 4	BCL4	i
B-cell CLL/lymphoma 5	BCL5	i
B-cell CLL/lymphoma 6	BCL6	ì
B-cell CLL/lymphoma 7	BCL7	i
B-cell CLL/lymphoma 8	BCL8	ĺ
B-cell CLL/lymphoma 9	BCL9	ĺ
BCL2-associated X protein	BAX	G
BCL2-related protein A1	BCL2A1	G
Beckwith-Wiedemann region 1A	BWR1A	G
Bestrophin	VMD2	Т
beta 2 microglobulin	B2M	1
beta-endorphin receptor		Ν
beta-Glucuronidase	GUSB	Ε
beta-N-acetylhexosaminidase, A		Ε
beta-N-acetylhexosaminidase, B		E
Bilirubin UDP-glucuronosyltransferase		Ε
Bleomycin hydrolase	BLMH	Ε
Bloom syndrome protein	BLM	G
Blue cone pigment	BCP	S
Bone morphogenetic protein, BMP1	BMP1	G
Bone morphogenetic protein, BMP2	BMP2	G
Bone morphogenetic protein, BMP3	BMP3	G
Bone morphogenetic protein, BMP4	BMP4	G
Bone morphogenetic protein, BMP5	BMP5	G
Bone morphogenetic protein, BMP6	BMP6	G
Bone morphogenetic protein, BMP7	BMP7	G
Bone morphogenetic protein, BMP8	BMP8	G
Brain derived neurotrophic factor	BDNF	\mathbf{G}_{n}
Brain derived neurotrophic factor (BDNF)	BDNFR	G
receptor		
Branched chain aminotransferase 1, cytosolic	BCAT1	Ε
Branched chain aminotransferase 2,	BCAT2	Ε
mitochondrial		
BRCA1-associated RING domain gene 1	BARD1	G
Breakpoint cluster region	BCR	G
Breast cancer 1	BRCA1	G
Breast cancer 2	BRCA2	G
Breast cancer, ductal, 1	BRCD1	G
•		

Breast cancer, ductal, 2 Bruton agammaglobulinaemia tyrosine kinase Butyrylcholinesterase	BRCD2 BTK BCHE	G G E
C3 convertase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Cadherin E	ATP2A1 ATP2A2 CDH1	E T G
Cadherin EP Cadherin N	CDH2	G
Cadherin P	CDH3	Ğ
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	G
Calcium channel, voltage-dependent, alpha 1F subunit		N
Calcium channel, voltage-dependent, Alpha- 1B (CACNL1A5)	CACNA1B	N
Calcium channel, voltage-dependent, Alpha- 1C	CACNA1C	N
Calcium channel, voltage-dependent, Alpha- 1D	CACNA1D	N
Calcium channel, voltage-dependent, Alpha- 1E (CACNL1A6)	CACNA1E	Ν
Calcium channel, voltage-dependent, Alpha- 2/delta	CACNA2	N
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3	CACNB3	Ν
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CÁCNA1S	N
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	Ν
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	N
Calcium channel, voltage-dependent, T-type		Ν
Calcium sensing receptor	CASR	T
Calmodulin 1	CALM1	G
Calmodulin 2 Calmodulin 3	CALM2 CALM3	G G
Calmodulin 3 Calmodulin dependant kinase	CALIVIS	.T.
Calmodulin-dependant protein kinase II	CAMK2A	G
Calnexin	CANX	Ğ
Calpain	CAPN, CAPN3	E
Canalicular multispecific organic anion transporter	CMOAT	T
Carbamoylphosphate synthetase 1	CPS1	Ε
Carbamoylphosphate synthetase 2	CPS2	E
Carbonic anhydrase 3	CA3	Ε
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	E

Carbonic anhydrase, beta Cardiac-specific homeobox, CSX Carnitine acetyltransferase Carnitine acylcarnitine translocase Carnitine transporter protein Cartilage oligomeric matrix protein	CA2 CSX CRAT CACT CDSP, SCD COMP, EDM1,	EGEETN
Cartilage-hair hypoplasia gene Caspase 1 Caspase 10 Caspase 2 Caspase 3 Caspase 4	PSACH CHH CASP1 CASP10 CASP2 CASP3 CASP4	NGGGGG
Caspase 5 Caspase 6 Caspase 7 Caspase 8 Caspase 9	CASP5 CASP6 CASP7 CASP8 CASP9	GGGGGG
Catechol-O-methyltransferase Catenin, alpha Catenin, beta Catenin, gamma Cathepsin K Caveolin 3	COMT CTNNA1 CTNNB1 CTSK CAV3	EGGGEE
CD1 CD44 Cdc 25 phosphatase Cdc2 CDX1	CD1 CD44 CDC2	
CEA Cell adhesion molecule, intercellular, ICAM Cell adhesion molecule, leukocyte-endothelial, LECAM (CD62)	ICAM1 LECAM1	G G G
Cell adhesion molecule, liver, LCAM Cell adhesion molecule, neural, NCAM1 Cell adhesion molecule, neural, NCAM120 Cell adhesion molecule, neural, NCAM2 Cell adhesion molecule, platelet-endothelial,	LCAM NCAM1 NCAM120 NCAM2 PECAM1	G G G G
PECAM Cell adhesion molecule, vascular, VCAM Cellubrevin c-erbB1 c-erbB2 c-erbB3 c-erbB4	VCAM1 CEB ERBB1 ERBB2 ERBB3 ERBB4	GNGGGG
Ceroid lipofuscinosis neuronal 2 Ceroid lipofuscinosis neuronal 3 Ceroid lipofuscinosis neuronal 4	CLN2 CLN3 CLN4	N N N

Ceroid lipofuscinosis neuronal 5 Ceroid lipofuscinosis neuronal 6 Chediak-Higashi syndrome 1 gene Chemokine MCAF Chemokine receptor CCR2 Chemokine receptor CCR3 Chemokine receptor CCR5 Chemokine receptor CXCR1 Chemokine receptor CXCR1 Chemokine receptor CXCR2 Chemokine receptor CXCR2 Chemokine receptor CXCR4 Chloride channel 5 Cholestasis, progressive familial intrahepatic 1 gene	CLN5 CLN6 CHS1 MCAF CCR2 CCR3 CCR5 CXCR1 CXCR2 CXCR4 CLCN5 FIC1	N N T I I I I I S G
Cholesterol ester transfer protein Choline acetyltransferase Choroideremia gene	CETP CHAT CHM	T E S
Chromogranin A	CHGA	Ğ
Ciliary neurotrophic factor (CNTF)	CNTF	G
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	Ğ
c-kit receptor tyrosine kinase		G
Clathrin		Т
Cleavage signal-1 protein	CS1	G
Cleft palate gene	CPX	G
Clusterin	CLU	G
CoA transferase		Ε
Cochlin	COCH	1
Cockayne syndrome gene, CKN1	CKN1	G
Collagen I alpha 1	COL1A1	S
Collagen I alpha 2	COL1A2	S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	· S
Collagen IV alpha 1	COL4A1	S
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	S
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	S S
Collagen IV alpha 6	COL4A6	S
Collagen IX alpha 2	COL9A2, EDM2	S
Collagen iX alpha 3 Collagen receptor	COL9A3	S
Collagen V alpha 1	COLR	S
Collagen V alpha 2	COL5A1	S
Collagen VI alpha 1	COL5A2	S
Collagen VI alpha 2	COL6A1	S
Collagen VI alpha 2 Collagen VI alpha 3	COL6A2	S S
Collagen VII alpha 3 Collagen VII alpha 1	COL6A3	S
A 11 - 12 - 13 - 13 - 13 - 13 - 13 - 13 -	COL10A1	S
	COL10A1	S
Conagon A aipha 1	COL11A1	S

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COLQ		E
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CNGA3		N
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PDE1B		Е
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PDE6A		E
	COL17A1 COLQ CSF1 CSF1R CSF2RA CSF2RA CSF2RA CSF3R MTATP6 CRSF3R MTATP6 CRYTN1 CBFA2 CRYBA CRYBA CRYPAA CR	CSF1 CSF1R CSF2 CSF2RA CSF2RB CSF3R CSF3R MTATP6 CRX CNTN1 CBFA1 CBFA2 CRHR1 CKBE CREBBP CRY1 CRY2 CRYAA CRYAB CRYBB2 CRYBB2 CRYBB2 CRYGA CSK ATP7A ATP7B CUBN CREB CREM PKA CNGA1 CNGA3 PDE1B PDE2A3 PDE3A PDE3A PDE4A PDE4C PDE5A

Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclin A Cyclin B Cyclin C Cyclin D Cyclin E Cyclin-dependent kinase 1 Cyclin-dependent kinase 10 Cyclin-dependent kinase 2 Cyclin-dependent kinase 3 Cyclin-dependent kinase 4 Cyclin-dependent kinase 5 Cyclin-dependent kinase 5 Cyclin-dependent kinase 7 Cyclin-dependent kinase 8 Cyclin-dependent kinase 9 Cyclin-dependent kinase 9 Cyclin-dependent kinase inhibitor 1A (P21,	PDE6B PDE7 PDE8 PDE9A CCNA CCNB CCNC CCND1 CCNE CCNF CDK1 CDK2 CDK3 CDK4 CDK5 CDK6 CDK7 CDK7 CDK8 CDK9 CDK9	
CIP1) Cyclin-dependent kinase inhibitor 1B (P27,	CDKN1B	G
KIP1) Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN1C	G
Cyclin-dependent kinase inhibitor 2A (p16) Cyclin-dependent kinase inhibitor 3 Cyclooxygenase 1 Cyclooxygenase 2 CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 CYP27 CYP27B1 CYP2A1 CYP2A13 CYP2A3 CYP2A6V2 CYP2B6	CDKN2A CDKN3 COX1 COX2 CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A1 CYP2A3 CYP2A3 CYP2A6V2 CYP2B6	

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Dihydrolipoyl dehydrogenase 2 Dihydrolipoyl transacetylase	PDHA PDHA	E E
Dihydroorotase		Ē
Dihydroxyacetonephosphate acyltransferase	DHAPAT	Ē
Disrupted meiotic cDNA 1, homolog	DMC1	Ğ
Distal-less homeobox 1	DLX1	G
Distal-less homeobox 2	DLX2	G
Distal-less homeobox 3	DLX3	G
Distal-less homeobox 4	DLX4	G
Distal-less homeobox 5	DLX5	G
Distal-less homeobox 6	DLX6	G
DNA damage binding protein, DDB1	DDB1	S
DNA damage binding protein, DDB2	DDB2	0
DNA directed polymerase, alpha	POLA	S E E
DNA glycosylases	1 02/	
DNA helicases		E
DNA Ligase 1	LIG1	
DNA methyltransferase	DNMT	E
DNA polymerase 1	DIAIAII	
DNA polymerase 2		E
DNA polymerase 3		E
DNA primase		
DNA-damage-inducible transcript 3	DDIT3	E S
DNA-dependant RNA polymerase	DD113	S E
DOPA decarboxylase	DDC	E
Doublecortin, DCX	DCX	S
Duffy blood group	FY.	S T
Dynamin	DNM1	
Dynein	SINIVI	G G
Dyskerin	DKC1	
Dystonia 1	DYT1	S S
Dystonia 3	DYT3	S
Dystonia 6	DYT6	S
Dystonia 7	DYT7	S
Dystonia 9	CSE	_
Dystrophia myotonica	DM, DMPK	S
Dystrophia myotonica, atypical	DM2	E
Dystrophin Tystoriisa, atypical	DMD	E
Dystrophin-associated glycoprotein 35kD,	SGCD	S
SCGD	SGCD	S
Dystrophin-associated glycoprotein 35kD,	SGCG	_
SGSG	3606	S
Dystrophin-associated glycoprotein 43kD	SCCB	•
Dystrophin-associated glycoprotein 50kD	SGCB SGCA	S
E74-like factor 1, ELF1	ELF1	S
EB1	LLI'I	G
Ectodermal Dysplasia 1 gene	ED1	G
Electron-transfering-flavoprotein alpha	ETFA	S
avoprotein alpita	LIFA	Т

Electron-transfering-flavoprotein beta Electron-transferring flavoprotein	ETFB ETFDH	T E
dehydrogenase		_
Empty spiracles (drosophila) homologue 1	EMX1	G
Empty spiracles (drosophila) homologue 2	EMX2	G
Endobrevin	VAMP8	N
Endocardial fibroelastosis 2 gene	EFE2	S
Endometrial bleeding-associated factor	EBAF	G
Endothelin 1	EDN1	N
Endothelin 2	EDN2	N
Endothelin 3	EDN3	N
Endothelin converting enzyme	ECE1	N
Endothelin receptor type A	EDNRA	N
Endothelin receptor type B	EDNRB	N
Engrailed-1	EN1	G
Engrailed-2	EN2	G
Enolase	ENO1	Ε
Enoyl CoA isomerase		Ε
Enterokinase	PRSS7, ENTK	E
Ephrin receptor tyrosine kinase A	EPHA	G
Ephrin receptor tyrosine kinase B	EPHB	G
Ephrin-A	EFNA	G
Ephrin-B	EFNB	G
Epidermal growth factor	EGF	G
Epidermal growth factor receptor	EGFR	G
Epilepsy, benign neonatal 4 gene	ICCA	Ε
Epilepsy, female restricted	EFMR	E
Epilepsy, progressive myoclonic 2 gene	EPM2A	Ε
Erythrocyte membrane protein band 4.1	EPB41	S
Erythrocyte membrane protein band 4.2	EPB42	S
Erythrocyte membrane protein band 7.2	EPB72	S
Erythroid kruppel-like factor	EKLF	G
Erythropoietin	EPO	i
Erythropoietin receptor	EPOR	
Estrogen receptor	ESR EIF4E	G
Eukaryotic initiation translation factor EWS RNA-binding protein	EWSR1	G
Excision repair complementation group 1	ERCC1	G E
protein	ERCOT	_
Excision repair complementation group 2	ERCC2	Ε
protein	ENGO2	_
Excision repair complementation group 2	ERCC3	Ε
protein		_
Excision repair complementation group 4	ERCC4	Ε
protein		_
Excision repair complementation group 6	ERCC6	Ε
protein		_
Exostosin 1	EXT1	S

Exostosin 2	EXT2	S
Exostosin 3	EXT3	S
Eyes absent 1	EYA1	G
Eyes absent 2	EYA2	G
Eyes absent 3	EYA3	G
Faciogenital dysplasia	FGD1, FGDY	T
Factor 1 (No. one)	F1	İ
Factor B, properdin		i
Factor D		i
Factor H	HF1	Ì
Factor I (letter I)	IF	i
Factor III	F3	i
Factor IX	F9	1
Factor V	F5	i
Factor VII	F7	i
Factor VIII	F8	i
Factor X	F10	i
Factor XI	F11	i
Factor XII	F12	i
Factor XIII A & B	F13A & F13B	·
Fanconi anemia, complementation group A	FANCA	Т
Fanconi anemia, complementation group C	FANCC	Ť
Fanconi anemia, complementation group D	FANCD	Ť
Fc fragment of IgG, high affinity IA, receptor for		Ġ
Fc fragment of IgG, low affinity IIa, receptor for		Ğ
(CD32)		
Fc fragment of IgG, low affinity Illa, receptor for	FCGR3A	G
(CD16)		
Fc receptor		1
Fertilin protein	FTNB	G
Fibrillin 1	FBN1	G
Fibrillin 2	FBN2	G
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	· G
Fibronectin precursor	FN1	G
Flavin-containing monooxygenase 1	FMO1	·Ε
Flavin-containing monooxygenase 2	FMO2	E
Flavin-containing monooxygenase 3	FMO3	Ε
Flavin-containing monooxygenase 4	FMO4	E
Flightless-II, Drosophila homolog of	FLII	G
Folic acid receptor	FOLR	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Follicular lymphoma variant translocation 1	FVT1	1
Follistatin		G
Forkhead rhabdomyosarcoma gene	FKHR	Ğ

F F	Forkhead transcription factor 10 Forkhead transcription factor 14 Forkhead transcription factor 7 Formiminotransferase	FKHL10 FKHL14 FKHL7	GGGE
F	Fragile site, folic acid type, rare, fra(X) A Fragile site, folic acid type, rare, fra(X) E Fragile site, folic acid type, rare, fra(X) F	FRAXA FRAXE FRAXF	N N N
	Frataxin Fringe secreted protein, lunatic	FRDA LFNG	G G
	Fringe secreted protein, manic	MFNG	G
	Fringe secreted protein, radical	RFNG	G
	Fructose-1,6-diphosphatase	FBP1	Ε
	-ucosyltransferase 6	FUT6	T
	Fukuyama type congenital muscular dystrophy	FCMD	G
	Fumarase	FH	Ε
ŀ	Fumarylacetoacetase	FAH	Ε
(G/T mismatch binding protein	GTBP, MSH6	G
(GABA receptor, alpha 1	GABRA1	N
(GABA receptor, alpha 2	GABRA2	N
(GABA receptor, alpha 3	GABRA3	N
(GABA receptor, alpha 4	GABRA4	N
	GABA receptor, alpha 5	GABRA5	N
(GABA receptor, alpha 6	GABRA6	N
(GABA receptor, beta 1	GABRB1	N
(GABA receptor, beta 2	GABRB2	N
,	GABA receptor, beta 3	GABRB3	N
,	GABA receptor, gamma 1	GABRG1	N
	GABA receptor, gamma 2	GABRG2	N
	GABA receptor, gamma 3	GABRG3	N
	GABA transaminase	ABAT	E
	Gadd45 (growth arrest & DNA-damage-inducib	ole protein)	E
	Galactocerebrosidase	GALC	E
	Galactokinase	GALK1	E
	Galactose 1-phosphate uridyl-transferase	GALT	E
	Galactosyltransferase 1	GT1	G
	Galactosyltransferase, alpha 1,3	GGTA1_	G
	Galactosyltransferase, beta 3	B3GALT	G
	Galanin	GAL	N
	Galanin receptor	GALNR1	N
,	Gamma-glutamyl carboxylase	GGCX	T
	Gap junction protein alpha 1	GJA1	Ţ
	Gap junction protein alpha 3	GJA3	T
	Gap junction protein alpha 8	GJA8	T
	Gap junction protein beta 1	GJB1	T
	Gap junction protein beta 2	GJB2	T
	Gap junction protein beta 3	GJB3	T
	Gastric Intrinsic factor, GIF	GIF	E
	Gastrin	GAS	G
	·		

Gastrin releasing peptide Gastrointestinal tumor-associated antigen 1 Gastrulation brain homeobox 2 GDP dissociation inhibitor 1 Gelsolin Geniospasm 1 Gephyrin Glial-cell derived neurotrophic factor (GDNF) receptor	GRP GA733 GBX2 GDI1 GSN GSM1	TIGGGGNN
Glial-cell derived neurotrophic factor, GDNF	GDNF	N
Glioma chloride ion channel, GCC		G
Glucagon receptor	GCGR	G
Glucagon-like peptide receptor 1	GLP1R	G
Glucocorticoid receptor	GRL	G
Glucose-6-phosphatase translocase	G6PT1	Е
Glucosidase, acid alpha	GAA	Ε
Glucosidase, acid beta	GBA	E
Glutamate decarboxylase, GAD	GAD1	E
Glutamate-cysteine ligase	GLCLC	E
Glutathione GDV4	GSH	T
Glutathione peroxidase, GPX1	GPX1	E
Glutathione peroxidase, GPX2	GPX2 GSR	Ε
Glutathione reductase, GSR Glutathione S-transferase mu 1, GSTM1	GSR GSTM1	E
Glutathione S-transferase mu 4, GSTM4	GSTWIT	E
Glutathione S-transferase theta 1, GSTT1	GSTT1	E
Glutathione S-transferase theta 2, GSTT2		E
Glutathione S-transferase, GSTP1	GSTP1	E
Glutathione S-transferase, GSTZ1	GSTZ1	E
Glutathione synthetase	GSS	E
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	E
GAPDH		_
Glycerol kinase	GK	Ε
Glycinamide ribonucleotide (GAR)	GART	Ε
transformylase		
Glycine dehydrogenase	GLDC	Ε
Glycine receptor, alpha	GLRA2	Ν
Glycine receptor, beta		N
Glycogen branching enzyme	GBE1	Ε
Glycogen phosphorylase	PYGL	Ε
Glycogen synthase 1 (muscle)	GLYS1	Ε
Glycogen synthase 2 (liver)	GYS2	Ε
Glycosyltransferases, ABO blood group	ABO	E
Glypican 3	GPC3, SDYS	G
GM2 ganglioside activator protein, GM2A	GM2A	E
Gonadotropin releasing hormone	GNRH	G
Gonadotropin releasing hormone receptor	GNRHR	G
Goosecoid GSC		G

Green cone pigment Growth arrest-specific homeobox	GCP GAX	S G
Growth factor receptor-bound protein 2	GRB2	G
Growth hormone 1	GH1	G
Growth hormone 2 (placental)	GH2	G
.,	GHR	
Growth hormone receptor		G
Growth hormone releasing hormone (GHRH)	GHRH	G
Growth hormone releasing hormone receptor	GHRHR	G
Growth/differentiation factor 5	GDF5	G
Growth-regulated protein precursor, GRO	GRO	1
GTP cylcohydrolase 1	GCH1	G
GTPase-activating protein, GAP	RASA1	G
Guanidinoacetate N-methyltransferase	GAMT	Ε
Guanine nucleotide-binding protein, alpha	GNAO1	Ν
activating activity polypeptide, GNAO		
Guanine nucleotide-binding protein, alpha	GNAI1	Ν
inhibiting activity polypeptide 1, GNAI1		
Guanine nucleotide-binding protein, alpha	GNAI2	Ν
inhibiting activity polypeptide 2, GNAI2	•	
Guanine nucleotide-binding protein, alpha	GNAI3	Ν
inhibiting activity polypeptide 3, GNAI3	·	
Guanine nucleotide-binding protein, alpha	GNAS1	Ν
stimulating activity polypeptide, GNAS1		
Guanine nucleotide-binding protein, alpha	GNAS2	Ν
stimulating activity polypeptide, GNAS2		
Guanine nucleotide-binding protein, alpha	GNAS3	Ν
stimulating activity polypeptide, GNAS3		• •
Guanine nucleotide-binding protein, alpha	GNAS4	Ν
stimulating activity polypeptide, GNAS4		•
Guanine nucleotide-binding protein, alpha	GNAT1	Ν
transducing activity polypeptide, GNAT1	3.0. 0.1	1.
Guanine nucleotide-binding protein, alpha	GNAT2	N
- ,	GIVATZ	IN
transducing activity polypeptide, GNAT2	GNB3	N
Guanine nucleotide-binding protein, beta	GIADO	1.4
polypeptide 3	CNICE	N.I
Guanine nucleotide-binding protein, gamma	GNG5	N
polypeptide 5	01140	
Guanine nucleotide-binding protein, q	GNAQ .	N
polypeptide		_
Guanylate cyclase 2D, membrane (retina-	GUCY2D	E
specific)		
Guanylate cyclase activator 1A (retina)	GUCA1A	Ε
Guanylate kinase	•	Ε
Gustducin, alpha (taste-specific G protein)	GDCA	N,
Haeme regulated inhibitor kinase		Ε
Haemoglobin epsilon		Т
Hairless	HR	G
Haptoglobin, alpha 1	HPA1	ł

Haptoglobin, alp	ha 2	HPA2	
Haptoglobin, bet	•	HPB	
Heat shock prote		111 5	1
Heat shock prote			1
Heat shock prote			
Heat shock prote			1
Heat shock prote			; [
Hela tumor supp		HTS1	Ġ
Hemochromatos		HFE	T
Hemopexin		HPX	1
Heparan sulfami	dase		Ė
•	epidermal growth factor	HBEGF	G
Hepatic nuclear		HNF3B	Ē
Hepatic nuclear		HNF4A	Ē
•	integration site 1	HVBS1	ī
	integration site 2	HVBS6	·
Hepatocyte grow		HGF	G
Hexosaminidase		HEXA,TSD	Ē
Hexosaminidase	В	HEXB	E
High mobility gro	up protein 1	HMG1	Ğ
High mobility gro	up protein 2	HMG2	G
High mobility gro	up protein C	HMGIC	G
High mobility gro	up protein Y	HMGIY	G
Histone family H	1	H1	G
Histone family H	2	H2	G
Histone family H	3	H3	G
Histone family H	4	H4	G
HLA-B associate	d transcript 1	BAT1	1
HLH transcription	n factor HAND1	HAND1	G
HLH transcription	n factor HAND2	HAND2	G
HMG-CoA lyase		HMGCL	E
HMG-CoA reduct		HMGCR	E
HMG-CoA syntha		HMGCS2	E
Holocarboxylase	-	HLCS	Ε
Holoprosencepha	•	HPE1	G
Holoprosencepha		HPE2	G
Holoprosencepha	-	HPE3	G
Holoprosencepha		HPE4	· · · · · · · · · · · · · · · · · · ·
Homeobox (HOX	· ·	HOXA1	G
Homeobox (HOX	. —	HOXA10	G
Homeobox (HOX	, •	HOXA11	G
Homeobox (HOX	· ·	HOXA12	G
Homeobox (HOX	, •	HOXA13	G
Homeobox (HOX		HOXA2	G
Homeobox (HOX		HOXA3	G
Homeobox (HOX	. •	HOXA4	G
Homeobox (HOX		HOXA5	G ·
Homeobox (HOX	.) gene Ab	HOXA6	G

Hamaahay (HOV) sana A7	HOVAZ	_
Homeobox (HOX) gene A7	HOXA7	G
Homeobox (HOX) gene A8	HOXA8	G
Homeobox (HOX) gene A9	HOXA9	G
Homeobox (HOX) gene B1	HOXB1	G
Homeobox (HOX) gene B2	HOXB2	G
Homeobox (HOX) gene B3	HOXB3	G
Homeobox (HOX) gene B4	HOXB4	G
Homeobox (HOX) gene B5	HOXB5	G
Homeobox (HOX) gene B6	HOXB6	G
Homeobox (HOX) gene B7	HOXB7	G
Homeobox (HOX) gene B8	HOXB8	G
Homeobox (HOX) gene B9	HOXB9	G
Homeobox (HOX) gene C13	HOXC13	Ğ
Homeobox (HOX) gene C4	HOXC4	Ğ
Homeobox (HOX) gene C8	HOXC8	Ğ
Homeobox (HOX) gene C9	HOXC9	G
Homeobox (HOX) gene D1	HOXD1	Ģ
Homeobox (HOX) gene D10	HOXD10	G
Homeobox (HOX) gene D12	HOXD12	G
Homeobox (HOX) gene D13	HOXD13	G
Homeobox (HOX) gene D3	HOXD3	G
, , , ,	HOXD4	G
Homeobox (HOX) gene D4	HOXD8	G
Homeobox (HOX) gene D8		G
Homeobox (HOX) gene D9	HOXD9	
Homeobox 11	HOX11	G
Homeobox HB24	HLX1	G
Homeobox HB9	HLXB9	G
Homeobox, PROX1	PROX1	G
HSSB, replication protein		E
Human atonal gene	ATOH1	G
Human chorionic gonadtrophin, hCG	CG	G
Human placental lactogen	CSH1	G
Huntingtin	HD	T
Hypoxanthine-guanine	HPRT	Ε
phosphoribosyltransferase, HGPRT		
Hypoxia inducible factor 1	HIF1A	Ε
Hypoxia inducible factor 2	•	Ε
IC7 A and B		- 1 -
Iduronate 2 sulphatase	IDS	E
Ikaros gene	IKAROS	G
Immunoglobulin alpha (lgA)	IGHA	ı
Immunoglobulin delta (IgD)	IGHD	ı
Immunoglobulin E (IgE) reponsiveness gene	IGER	ı
Immunoglobulin E (IgE) serum concentration	IGES	i
regulator gene		•
Immunoglobulin epsilon (IgE)	IGHE	1
Immunoglobulin gamma (IgG) 2	IGHG2	i
Immunoglobulin heavy mu chain	IGHM	1
manuficular neavy me enam	101 HVI	ŧ

Immunoglobulin J polypeptide Immunoglobulin kappa constant region Immunoglobulin kappa variable region Indian hedgehog, ihh Inhibin, alpha Inhibin, beta A Inhibin, beta B Inhibin, beta C Inosine monophosphate dehydrogenase,	IGJ IGKC IGKV IHH INHA INHBA INHBB	GGGGGE
•	ITPR1 ITPR3 INS IPF1 INSR IRS1 IGF1 IGF1R IGF2 IGF2R ITGB1 ITGB2 ITGB3 ITGB4 ITGB5 ITGB6 ITGB7 ITGA1 ITGA2 ITGA3 ITGA4 ITGA5 ITGA4 ITGA5 ITGA6 ITGA7 ITGA8 ITGA7 ITGA8 ITGA7 ITGAM1 ICAM2 ICAM1 ICAM2 ICAM3 IFNA1 IFNB	
Interferon gamma Interferon gamma receptor 1 Interferon gamma receptor 2 Interferon regulatory factor 1	IFNG IFNGR1 IFNGR2 IRF1	1 1

Interferon regulatory factor 4	IRF4
Interleukin(IL) 1 receptor	IL1R
Interleukin(IL) 1, alpha	IL1A
Interleukin(IL) 1, beta	IL1B
Interleukin(IL) 10	IL10
Interleukin(IL) 10 receptor	IL10R
Interleukin(IL) 11	IL11
Interleukin(IL) 11 receptor	IL11R
Interleukin(IL) 12	IL12
Interleukin(IL) 12 receptor, beta 1	IL12RB1
Interleukin(IL) 13	IL13
Interleukin(IL) 13 receptor	IL13R
Interleukin(IL) 2	IL2
Interleukin(IL) 2 receptor, alpha	IL2RA
Interleukin(IL) 2 receptor, gamma	IL2RG
Interleukin(IL) 3	IL3
Interleukin(IL) 3 receptor	IL3R I
Interleukin(IL) 4	IL4
Interleukin(IL) 4 receptor	IL4R
Interleukin(IL) 5	IL5
Interleukin(IL) 5 receptor	IL5R
Interleukin(IL) 6	IL6
Interleukin(IL) 6 receptor	IL6R I
Interleukin(IL) 7	!L7
Interleukin(IL) 7 receptor	IL7R
Interleukin(IL) 8	IL8
Interleukin(IL) 8 receptor	IL8R I
Interleukin(IL) 9	IL9
Interleukin(IL) 9 receptor	IL9R
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA
IP3 kinase	E
Isocitrate dehydrogenase	E
Isovaleric acid CoA dehydrogenase	IVD E
Janus kinase 1	JAK1 G
Janus kinase 2	JAK2 G
Janus kinase 3	JAK3 G
Kallman syndrome gene 1	KAL1 G
Kell blood group precursor	XK, KEL T
Keratin 1	KRT1 S
Keratin 10	KRT10 S
Keratin 11	KRT11 S
Keratin 12	KRT12 S
Keratin 13	KRT13 S
Keratin 14	
Keratin 15	KRT14 S KRT15 S KRT16 S
Keratin 16	KRT16 S
Keratin 17	KRT17,PCHC1 S
Keratin 18	KRT18 S

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Keratin 2	KRT2	S
Keratin 3	KRT3	S
Keratin 4	KRT4	S
Keratin 5	KRT5	S
Keratin 6	KRT6	S
Keratin 7	KRT7	S S
Keratin 8	KRT8	S
Keratin 9	KRT9	S
Ketohexokinase	KHK	E
Kinectin	KTN1	G
Kinesin, heavy chain	KNSL1	G
Kinesin, light chain	KNS2	G
L1 cell adhesion molecule	L1CAM	Ν
Lactotransferrin	LTF ~	Т
Lamin A/C	LMNA	Ġ
Laminin 5, alpha 3	LAMA3	Ğ
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	Ğ
Laminin M	LAMM	Ğ
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta binding	LTBP2	G
protein 2	21012	0
•	LEP	G
Leptin	LEPR	G
Leptin receptor	LIF	G
Leukaemia inhibitory factor	LIFR	G
Leukaemia inhibitory factor receptor	LIFK	_
Leukin	LST-1	
Leukocyte-specific transcript 1	L31-1	!
Leukotriene A4 hydrolase	LTAAC	1
Leukotriene A4 synthase	LTA4S	E
Leukotriene B4 receptor	1.7040	_
Leukotriene B4 synthase	LTB4S	E
Leukotriene C4 receptor		1
Leukotriene C4 synthase	LTC4S	E
Leukotriene D4/E4 receptor		ı
LH/choriogonadotropin (CG) receptor	LHCGR	G
LIM homeobox protein 1	LHX1	G
LIM homeobox protein 2	LHX2	G
LIM homeobox protein 3	LHX3	G
LIM homeobox protein 4	LHX4	G
LIM homeobox transcription factor 1, beta	LMX1B	G
Limb girdle muscular dystrophy 1A	LGMD1A	G
Limb girdle muscular dystrophy 1B	LGMD1B	G
Limb girdle muscular dystrophy 2G	LGMD2G	G
Limb girdle muscular dystrophy 2H	LGMD2H	G
Limbic associated membrane protein	LAMP	G
LIM-domain only protein 1	LMO1	Ğ
LIM-domain only protein 2	LMO2	Ğ
Lim domain only proton a		_

LIM-domain only protein 3	LMO3	G
LIM-domain only protein 4	LMO4	G
Lipoma-preferred partner gene	LPP	G
Lipoprotein receptor, Low Density	LDLR	Т
Lipoxygenase 12 (platelets)	LOG12	1
Lipoxygenase 5 (leukocytes)		Ì
Long QT-type 2 potassium channels	LQT2, KCNH2	Ť
Loricrin,	LOR	s
Low density lipoprotein receptor-related protein		T
precursor	-	•
Luteinizing hormone, beta chain	LHB	G
Lymphoblastic leukemia derived sequence 1	LYL1	Ĭ
Lymphocyte-specific protein tyrosine kinase	LCK	i
Lymphoid enhancer-binding factor	LEF-1	Ġ
Lysosome-associated membrane protein 1	LAMP1	G
Lysosome-associated membrane protein 2	LAMP2	G
MAD (mothers against decapentaplegic,	MADH2	G
Drosophila) homologue 2	MADITE	G
MAD (mothers against decapentaplegic,	MADH3	G
Drosophila) homologue 3	**************************************	0
MAD (mothers against decapentaplegic,	MADH4	G
Drosophila) homologue 4		•
MADS box transcription-enhancer factor 2A	MEF2A	G
MADS box transcription-enhancer factor 2B	MEF2B	Ğ
MADS box transcription-enhancer factor 2C	MEF2C	Ğ
MADS box transcription-enhancer factor 2D	MEF2D	G
·	MDH2	E
Malignant proliferation, eosinophil gene	MPE	ī
Malonyi CoA decarboxylase		Ė
Malonyl CoA transferase		Ē
	MANB	E
, I ,	MANBA	Ē
_	MAPKK1; MEK1	Ğ
MAPK kinase 4	MAPKK4; MEK4;	Ğ
THE TENEDOS T	SERK1	•
MAPK kinase 6	MAPKK6; MEK6	G
MAPKK kinase	MAPKKK	Ğ
		-G
	MMP1	Ē
•	MMP10	Ē
•	MMP11	Ē
· ·	MMP12	Ē
· · · · · · · · · · · · · · · · · · ·	MMP13	Ē
•	MMP14	Ē
· ·	MMP15	E
	MMP16	Ē
· ·	MMP17	E
•	MMP18	E
···	* · · · · · · · · · · · · · · · · · · ·	_

Matrix metalloproteinase 19	MMP19	E
Matrix metalloproteinase 2	MMP2	Ē
Matrix metalloproteinase 3	MMP3, STMY1	E
Matrix metalloproteinase 4	MMP4	E
Matrix metalloproteinase 5	MMP5	E
Matrix metalloproteinase 6	MMP6	E E
Matrix metalloproteinase 7	MMP7	E
Matrix metalloproteinase 8	MMP8	E
Matrix metalloproteinase 9	MMP9	E
MAX-interacting protein 1	MXI1	G
MEK kinase, MEKK	·	
Melanocortin 1 receptor	MC1R	E T
Melanocortin 2 receptor	MC2R	
Melanocortin 4 receptor	MC4R	T
Menin		T
	MEN1	G
Mesoderm-specific transcript	MEST	G
Methionine adenosyltransferase	MAT1A, MAT2A	Ε
Methionine synthase	MTR	E
Methionine synthase reductase	MTRR	EEE
Methylguanine-DNA methyltransferase	MGMT	E
Methylmalonyl-CoA mutase	MUT	
Mevalonate kinase	MVK	Ε
MHC Class I: A	•	ł
MHC Class I: B		I
MHC Class I: C		l l
MHC Class I: LMP-2, LMP-7		t
MHC Class I: Tap1	ABCR, TAP1	ı
MHC Class II: DP	HLA-DPB1	1
MHC Class II: DQ		!
MHC Class II: DR		1
MHC Class II: Tap2	TAP2, PSF2	I
MHC Class II:Complementation group A	MHC2TA	ı
MHC Class II:Complementation group B	rfxank	1
MHC Class II:Complementation group C	RFX5	1
MHC Class II:Complementation group D	RFXAP	1
Microphthalmia-associated transcription factor	MITF .	G
Microsomal triglyceride transfer protein	MTP	Т
Microtuble associated protein	MAP	S
Midline 1	MID1	Ğ
Mismatch repair gene, PMSL1	PMS1	Ğ
Mismatch repair gene, PMSL2	PMS2	Ğ
Mitochondrial trifunctional protein, alpha	HADHA	Ē
subunit		_
Mitochondrial trifunctional protein, beta subunit	HADHR	Ε
Mitogen-activated protein (MAP) kinase	MAPK	G
Molybdenum cofactor synthesis 1	MOCS1	E
Molybdenum cofactor synthesis 2	MOCS1	E
Monoamine oxidase A	MAOA	E
		_

Monoamine oxidase B	MAOB	E
Monocyte chemoattractant protein 1	MCP1	1
Motilin	MLN	G
Msh homeobox homolog 1	MSX1	G
Msh homeobox homolog 2	MSX2	G
Mucolipidoses	GNPTA	Ē
Mulibrey nanism	MUL	Ť
	MRP	Ġ
Multidrug resistance associated protein	CHRM1	
Muscarinic receptor, M1		N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N.
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Muscle phosphorylase	PYGM	E
Mutated in colorectal cancers, MCC	MCC	G
MutL homolog 1	MLH1	G
MutS homolog 2	MSH2	G
MutS homolog 3	MSH3	G
Myelin protein peripheral 22	PMP22	S
Myelin protein zero	MPZ	S
Myelodysplasia syndrome 1 gene	MDS1	Ğ
Myeloid leukemia factor-1	MLF1	Ī
Myocilin	MYOC	Ť
Myogenic factor 3	MYF3	Ġ
Myogenic factor 4	MYF4	G
Myogenic factor 5	MYF5	G
• •	MYOM1	S
Myomesin 1	MYOM2	S
Myomesin 2	MYO15	S
Myosin 15	MYO6	S
Myosin 6		S
Myosin 7A	MYO7A	
Myosin, cardiac	MYH7	S
Myotubularin	MTM1	S
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3	G
Na+/H+ exchanger 1	NHE1	· T ·
Na+/H+ exchanger 2	NHE2	T
Na+/H+ exchanger 3	NHE3	Т
Na+/H+ exchanger 4	NHE4	T
Na+/H+ exchanger 5	NHE5	Т
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	, E
N-acetylglucosamine-6-sulfatase	GNS	E
N-acetylglucosaminidase, alpha	NAGLU	Е
N-acetyltransferase 1	NAT1	Ē
N-acetyltransferase 2	NAT2	Ē
NADH dehydrogenase		Ē
· -		

NADH dehydrogenase (ubiquinone) Fe-S protein 1	NDUFS1	E
NADH dehydrogenase (ubiquinone) Fe-S protein 4	NDUFS4	E
NADH dehydrogenase (ubiquinone) flavoprotein 1	NDUFV1	E
NADH-cytochrome b5 reductase	DIA1	E
NADPH-dependent cytochrome P450	POR	Ē
reductase	•	
Natural resistance-associated macrophage	NRAMP1	· 1
protein 1		
NB6		1
Necdin	NDN	G
Nephronophthisis 1	NPHP1	T
Nephronophthisis 2	NPHP2	Т
Nephrosis 1	NPHS1	Т
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neural retina-specific gene	NRL	G
Neuraminidase sialidase	NEU	T
Neuregulin	HGL	G
Neurite growth-promoting factor 2	MDK	N
Neurite inhibitory protein		N
Neuroendocrine convertase 1	NEC1, PCSK1	E
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurofilament protein, heavy	NFH	S
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68	NF68	S
Neuronal apoptosis inhibitory protein	NAIP	1
Neuronal molecule-1		ļ.
Neuronal molecule-1 receptor	AIDNA	1
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Neurotrophic tyrosine kinase receptor 1	NTRK1	G
Neurotrophin 3	NTF3 or NT3	Jirk Paga Ga
	NRTN	G
Neutral endopeptidase	NOT4	E
Neutrophil cystolic factor 1 Neutrophil cystolic factor 2	NCF1 NCF2	!
Niacin receptor	NCFZ	1
Nibrin	NDC1	G
Nitric oxide synthase 1, NOS1	NBS1 NOS1	G
Nitric oxide synthase 1, NOS1		E
Nitric oxide synthase 2, NOS2	NOS2 NOS3	E
Nodal	NOS3 NODAL	E
Hodal	NODAL	G

Noggin Norrie disease protein Notch 1 Notch 2 Notch 3 Notch ligand - jagged 1 Nuclear factor I-kappa-B-like gene Nuclear factor kappa beta Nuclear factor of activated T cells (NFAT) complex, cytosolic	NOG NDP NOTCH1 NOTCH2 NOTCH3 JAG1, AGS IKBL NFKB	000000
Nuclear factor of activated T cells (NFAT)	NFATP	G
complex, preexisting component	NU INAA 4	_
Nuclear mitotic apparatus protein 1	NUMA1 NPM1	G
Nucleophosmin	NDPKA	T
Nucleoside diphosphate kinase-A Ocular albinism 1	OA1	E S
Oculocutaneous albinism II	OCA2	S
Oligophrenin-1	OPHN1	G
Oncogene abi1	ABL1	G
Oncogene abl2		G
Oncogene akt1		Ğ
Oncogene akt2	AKT2	G
Oncogene axl	AXL	G
Oncogene bcl2		G
Oncogene bcr/abl		G
Oncogene B-lym	·	G
Oncogene B-raf		G
Oncogene clk1		G
Oncogene c-myc	•	G
Oncogene cot		G
Oncogene crk		G
Oncogene crkl		G
Oncogene ect2		G
Oncogene ELK1	ELK1	G
Oncogene ELK2	ELK2	G
Oncogene ems1		G
Oncogene ERB	·	G
Oncogene ERB2	•	G
Oncogene ERBA		G G
Oncogene ERBAL2		G
Oncogene ERG (early reponse gene)		G
Oncogene ETS1 Oncogene ETS2		G
Oncogene EVI1	EVI1	G
Oncogene fes	- ∀ † 1	G
Oncogene fgr		G
Oncogene fos	FOS	G
Oncogene fps	. 00	G
Ollogono ipo		_

0.14		
Oncogene GLI1	GLI	G
Oncogene GLI2	GLI2	G
Oncogene GLI3	GLI3	G
Oncogene gro1		G
Oncogene gro2		G
Oncogene Ha-ras	HRAS	G
Oncogene hs1		G
Oncogene hst	FGF4	G
Oncogene int1	WNT1	G
Oncogene int2	FGF3	G
Oncogene int3	Notch4	Ğ
Oncogene int4	WNT3	Ğ
Oncogene jun	JUN	G
Oncogene KIT	KIT, PBT	G
Oncogene LCO	LCO	G
Oncogene I-myc	200	G
Oncogene Ipsa		G
Oncogene lyn		G
Oncogene maf	•	G
Oncogene mas1		
Oncogene mcf2	•	G G
Oncogene mdm2	MDM2	
Oncogene mel	MDMZ	G
-	MET	G
Oncogene met	MET	G
Oncogene mos		G
Oncogene mpl	N 41 18 4 4	G
Oncogene MUM1	MUM1	G
Oncogene myb	MYB	G
Oncogene myc	MYC	G
Oncogene n-myc		G
Oncogene N-ras (neuroblastoma v-ras)	NRAS	G
Oncogene ovc		G
Oncogene pim1		G
Oncogene pti-1sea		G
Oncogene pvt1		G
Oncogene raf	RAF	G
Oncogene ralb		G
Oncogene rel	· .	G
Oncogene ret	RET	G.
Oncogene r-myc	•	G
Oncogene ros		G
Oncogene R-ras		G
Oncogene sis	PDGFB	Ğ
Oncogene ski		Ğ
Oncogene sno		G
Oncogene spi1		G
Oncogene src		G
Oncogene tc21		G
		9

Oncogene TEL	ETV6	_
Oncogene tim	L1 V 0	G
Oncogene vavtrk		G
Oncogene v-Ki-ras2	KRAS2	G
•	KRA32	G
Oncogene yes		G
Oncogene yuasa	OSM	G
Oncostatin M	OSM	G
Oncostatin M receptor	OSMR	G
Orexin	OX	G
Orexin 1 receptor	OX1R	G
Orexin 2 receptor	OX2R	G
Ornithine delta-aminotransferase	OAT	Ε
Ornithine transcarbamoylase	OTC, NME1	Ε
Orthodenticle (Drosophila) homolog 1	OTX1	G
Orthodenticle (Drosophila) homolog 2	OTX2	G
Osteocalcin		S
Osteonectin	ON	G
Osteopontin	OPN .	G
Osteoprotegerin	OPG	G
Otoferlin	OTOF	Ν
Oxytocin	OXT	N
Oxytocin receptor	OXTR	Ν
p21-activated kinase 3	PAK3	G
Paired box homeotic gene 1	PAX1	G
Paired box homeotic gene 2	PAX2	G
Paired box homeotic gene 3	PAX3	G
Paired box homeotic gene 6	PAX6	G
Paired box homeotic gene 7	PAX7	G
Paired box homeotic gene 8	PAX8	G
Paired-like homeodomain transcription factor 2	PITX2	G
Paired-like homeodomain transcription factor 3	PITX3	G
Palmitoyl-protein thioesterase	PPT	Т
Pancreatic amylase		E
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	G
Parathyroid hormone-like hormone	PTHLH	G
Parvalbumin	PVALB	G
Patched (Drosophila) homolog, PTCH	PTCH	G
PCNA (proliferating cell nuclear antigen)		E
Peanut-like 1	PNUTL1	ī
Pendrin, PDS	PDS	T
Peptidylglycine alpha-amidating	PAM	Ė
monooxygenase		_
Peripherin, PRPH		S
Peroxisomal membrane protein 1	PXMP1	S
Peroxisomal membrane protein 3	PXMP3	T
Peroxisome biogenesis factor 1	PEX1	Ť
y = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =		•

Peroxisome biogenesis factor 19	PEX19	Т
Peroxisome biogenesis factor 6	PEX6	Ť
Peroxisome biogenesis factor 7	PEX7	Ť
Peroxisome proliferative activated receptor,	PPARA	Ť
alpha		•
Peroxisome proliferative activated receptor,	PPARG	Т
gamma		'
Peroxisome receptor 1	PXR1	Т
Phenylethanolamine N-methyltransferase,	PNMT	Ė
PNMT	1 141411	
Phosphatase & tensin homolog	PTEN	_
Phosphate regulating gene with homologies to	PHEX	G G
endopeptidases on the X chromosome	TILX	
Phosphatidylinositol glycan, class A	PIGA	_
(paroxysmal nocturnal hemoglobinuria)	TIGA	G
Phosphatidylinositol transfer protein	PITPN	_
Phosphodiesterase 1 / nucleotide	PDNP1	G
pyrophosphatase 1	PDNF I	G
Phosphodiesterase 1 / nucleotide	PDNP2	_
pyrophosphatase 2	PUNP2	G
• • •	DDND2	_
Phosphodiesterase 1 / nucleotide	PDNP3	G
pyrophosphatase 3	DEM	_
Phosphofructokinase, liver	PFKL	Ε
Phosphoructokinase, muscle	PFKM	E
Phosphoglucose isomerase	GPI	E
Phosphoglycerate kinase 1	PGK1	E
Phosphoglycerate mutase 2	PGAM2	E
Phospholipase A2, group 10	PLA2G10	-
Phospholipase A2, group 1B	PLA2G1B	I
Phospholipase A2, group 2A	PLA2G2A	ı
Phospholipase A2, group 2B	PLA2G2B	l
Phospholipase A2, group 4A	PLA2G4A	i
Phospholipase A2, group 4C	PLA2G4C	ı
Phospholipase A2, group 5	PLA2G5	Ì
Phospholipase A2, group 6	PLA2G6	ļ
Phospholipase C alpha		ı
Phospholipase C beta		1
Phospholipase C delta	PLCD1	- -
Phospholipase C epsilon		1
Phospholipase C gamma	PLCG1	1
Phosphomannomutase 1	PMM1	G
Phosphomannomutase 2	PMM2	G
Phosphomannomutase-2	PMM2	Т
Phosphorylase kinase deficiency, liver	PHK	Ε
Phosphorylase kinase, alpha 2	PHKA2	E
Phytanoyl-CoA hydroxylase	PHYH	G
Plakophilin 1	PKP1	Τ
Plasminogen	PLG	E

Plasminogen activator inhibitor 1	PAI1	E
Plasminogen activator inhibitor 2	PAI2	Ε
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	Е
Plasminogen activator, Urokinase	UPA; PLAU	Ε
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Plectin 1	PLEC1	Т
Poly (ADP-ribose) synthetase	PARS	Ε
Poly(A) binding protein 2	PABP2	G
Postsynaptic density-95 protein	PSD95	Ν
Potassium inwardly-rectifying channel J1	KCNJ1	Ν
Potassium inwardly-rectifying channel J11	KCNJ11	Ν
Potassium voltage-gated channel A1	KCNA1	Ν
Potassium voltage-gated channel E1	KCNE1	Ν
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	Ν
Potassium voltage-gated channel Q3	KCNQ3	Ν
Potassium voltage-gated channel Q4	KCNQ4	Ν
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)	•	
POU domain, class 3, transcription factor 4	POU3F4	G
POU domain, class 4, transcription factor 3	POU4F3	G
Pre-B-cell leukemia transcription factor 1	PBX1	G
Preproglucagon	GCG;GLP1; GLP2	G
Procollagen N-protease		E
Procollagen peptidase		Ε
Profibrinolysin		G
Progesterone receptor (RU486 binding	PGR	G
receptor)		
Prohibitin	PHB	G
Prolactin	PRL	G
Prolactin receptor	PRLR	G
Prolactin releasing hormone	PRH	G
Proliferin	PLF	G
Proline dehydrogenase	PRODH	Ε
Pro-melanin-concentrating hormone	PMCH	G
Promyelocytic leukemia gene	PML	G
Proopiomelanocortin	POMC	Ν
Prophet of Pit1	PROP1	G
Propionyl-CoA carboxylase, alpha	PCCA	Ε
Propionyl-CoA carboxylase, beta	PCCB	Ε
Prosaposin	PSAP	N
Prostaglandin (PG) D synthase, hematopoietic	PGDS	Ε
Prostaglandin isomerase		G
Prostaglandin-endoperoxidase synthase 2	PTGS2	G
Prostate cancer anti-metastasis gene KAI1	KAI1	G
Protease nexin 2	PN2	Ε

Protective protein for beta-galactosidase	PPGB	E
Protein C	PROC	1
Protein kinase A		Ε
Protein kinase B	PRKB	
Protein kinase C, alpha	PRKCA	Ε
Protein kinase C, gamma	PRKCG	Ε
Protein kinase DNA-activated	PRKDC	E
Protein kinase G	•	Ε
Protein phosphatase 1, regulatory (inhibitor) subunit 3	PPP1R3	E
Protein phosphatase 2, regulatory subunit A,	PPP2R1B	Е
beta isoform	11121110	_
Protein tyrosine phosphatase, non-receptor	PTPN12	G
type 12		_
Protoporphyrinogen oxidase	PPOX	Е
Pterin-4-alpha-carbinolamine	PCBD	_
Purine nucleoside phosphorylase	NP	E
Purinergic receptor P1A1		N
Purinergic receptor P1A2		N
Purinergic receptor P1A3	•	N
Purinergic receptor P2X, 1	P2RX1	N
Purinergic receptor P2X, 2	P2RX2	N
Purinergic receptor P2X, 3	P2RX3	N
Purinergic receptor P2X, 4	P2RX4	N
Purinergic receptor P2X, 5	P2RX5	N
Purinergic receptor P2X, 6	P2RX6	N.
Purinergic receptor P2X, 7	P2RX7	N
Purinergic receptor P2Y, 1	P2RY1	N
Purinergic receptor P2Y, 11	P2RY11	N
Purinergic receptor P2Y, 2	P2RY2	N
Pyrroline-5-carboxylate synthetase	PYCS	Ë
Pyruvate carboxylase	PC	Ē
Pyruvate decarboxylase	PDHA	Ē
Pyruvate kinase	PKLR	Ē
RAD51, DNA repair protein	RAD51	G
RAD52, DNA repair protein	RAD52	G
RAD54, DNA repair protein	RAD54	G
RAD55, DNA repair protein	RAD55	, G
RAD57, DNA repair protein	RAD57	G
Ras-G-protein	RAS	G
Rathke pouch homeobox, RPX	RPX .	G
Receptor tyrosine kinase (RTK), Nsk2	NSK2	G
Recombination activating gene 1	RAG1	
Recombination activating gene 2	RAG2	G G
Red cone pigment	RCP	S
Relaxin H1	RLN1	
Relaxin H2	RLN2	· G
Replication factor A	INCINE	G E
Nophodion idolor A		

Replication factor C Retinal pigment epithelium specific protein (65kD)	RFC2 RPE65	E S
Retinitis pigmentosa gene 1	RP1	S
Retinitis pigmentosa gene 2	RP2	Š
Retinitis pigmentosa gene 3	RP3	S
Retinitis pigmentosa gene 6	RP6	s
Retinitis pigmentosa gene 7	RP7, RDS	S
Retinoblastoma 1	RB1	G
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	Ğ
Retinoic acid receptor, gamma	RARG	Ğ
Retinoid X receptor, alpha	RXRA	Ğ
Retinoid X receptor, beta	RXRB	Ğ
Retinoid X receptor, gamma	RXRG	Ğ
Retinoschisis, X-linked, juvenile	RS	Ğ
Rhabdoid tumors	SMARCB1	G
Rhodopsin	RHO	S
Ribonucleotide reductase, RRM		Ε
Ribosomal protein L13A	RPL13A	G
Ribosomal protein L17	RPL17	G
Ribosomal protein S19	RPS19	Ε
Ribosomal protein S4, X-linked	RPS4X	Ε
Ribosomal protein S6 kinase	RPS6KA3	E
Ribosomal protein S9	RPS9	G
RIGUI	RIGUI	G
Rod outer segment membrane protein 1	ROM1	S
Ryanodine receptor 1, skeletal	RYR1	G
SA homolog	SAH	G
Sal-like 1	SALL1	G
Secretin	SCT	T
Semaphorin A4	SEMA4	S
Semaphorin A5	SEMA5	S
Semaphorin D		S
Semaphorin E	SEMAE	S
Semaphorin F	SEMA3/F	S
Semaphorin W	SEMAW	S
Serine/threonine kinase 11	STK11	G
Serine/threonine kinase 2	STK2	G
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N

Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Serum amyloid A	SAA	T
Serum amyloid P	SAP	Ť
Sex determining region Y, SRY	SRY	Ġ
Short stature homeobox	SHOX	G
Sialoprotein, bone	BSP	G
Signal transducer and activator of transcription		G
1	SIAIT ,	G
Signal transducer and activator of transcription	STAT2	G
2		0
Signal transducer and activator of transcription	STAT3	G
3		
Signal transducer and activator of transcription	STAT4	G
4		
Signal transducer and activator of transcription	STAT5	G
5		
Signaling lymphocyte activation molecule	SLAM	ı
Sine oculis homeobox, drosophila, homolog 1	SIX1	G
Sine oculis homeobox, drosophila, homolog 2	SIX2	G
Sine oculis homeobox, drosophila, homolog 5	SIX5	G
Sjoegren (Sjogren) syndrome antigen A1	SSA1	ı
Slug protein	•	G
Small nuclear ribonucleoprotein polypeptide N	SNRPN	S
Smoothelin	SMTN	G
Smoothened (Drosophila) homolog	SMOH	G
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	Ν
Sodium channel, non-voltage gated 1, gamma	SCNN1G	Ν
Sodium channel, voltage gated, type IV, alpha	SCN4A	N
polypeptide		
Sodium channel, voltage gated, type V, alpha	SCN5A	N
polypeptide		
Sodium channel, voltage-gated, type 1, beta	SCN1B	N.
polypeptide		
Solute carrier family 1 (amino acid transporter),	SLC1A6	Т
member 6	·	
Solute carrier family 1 (glial high affinity	SLC1A3	Т
glutamate transporter), member 3		
Solute carrier family 1 (glutamate transporter),	SLC1A1	Т
member 1		
Solute carrier family 1 (glutamate transporter),	SLC1A2	Т
member 2		
Solute carrier family 1 (neutral amino acid	SLC1A4	Т

Solute carrier family 10 (sodium/bile acid cotransporter family),member 1 Solute carrier family 10 (sodium/bile acid cotransporter family),member 2 Solute carrier family 12, member 1 Solute carrier family 12, member 1 Solute carrier family 12, member 3 Solute carrier family 12, member 3 SLC12A2 T Solute carrier family 12, member 3 SLC12A3 Solute carrier family 14, member 2 SLC14A2 Solute carrier family 15 (H+/peptide SLC15A1 Transporter, intestinal), member 1 Solute carrier family 16 (H+/peptide SLC15A1 Transporter, kidney), member 2 Solute carrier family 16 (monocarboxylate transporter), member 1 Solute carrier family 16 (monocarboxylate transporter), member 1 Solute carrier family 17, member 1 Solute carrier family 17, member 2 SLC17A1 TSolute carrier family 17, member 2 SLC17A2 TSolute carrier family 18, member 3 SLC18A3 TSOlute carrier family 19 (folate transporter), SLC19A1 Transporter), member 1 Solute carrier family 2 (facilitated glucose transporter), member 1 Solute carrier family 2 (facilitated glucose SLC2A1 Transporter), member 2 Solute carrier family 2 (facilitated glucose SLC2A3 Transporter), member 3 Solute carrier family 2 (facilitated glucose SLC2A4 Transporter), member 4 Solute carrier family 2 (facilitated glucose SLC2A4 Transporter), member 3 Solute carrier family 2 (facilitated glucose SLC2A3 Transporter), member 4 Solute carrier family 2 (facilitated glucose SLC2A4 TSolute carrier family 2 (facilitated glucose SLC2A5 Transporter), member 3 Slc20A2 TSolute carrier family 20, member 3 Slc20A3 TSolute carrier family 21, member 2 Slc20A2 TSolute carrier family 22, member 1 Slc22A5 TSolute carrier family 21, member 2 Slc22A6 TSolute carrier family 22, member 1 Slc22A7 TSolute carrier family 22, member 1 Slc22A8 TSolute carrier family 22, member 1 Slc22A6 TSolute carrier family 25, member 1 Slc22A6 TSolute carrier family 26, member 1 Slc22A6 TSolute carrier family 4 (anion exchanger), Slc4A1 Tmember 1 Solute carrier family 4 (anion exchanger), Slc4A3 TSlc4A3 TSlc4A4 Tmember 1	transporter), member 4			
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member 2		01.0440		_
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Solute carrier family 4 (anion exchanger), SLC4A3		CL CAAC		_
	Solute carrier family 4 (anion exchanger),	SLC4A3		Ī.T

member 3		
Solute carrier family 5 (sodium/glucose	SLC5A1	Т
transporter), member 1	GEGGAT	'
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2	0200712	
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5	0200710	ı
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ACID transporter), member 1		•
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		•
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		•
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		•
Solute carrier family 6, member 10	SLC6A10	Т
Solute carrier family 6, member 6	SLC6A6	Ť
Solute carrier family 6, member 8	SLC6A8	Ť
Solute carrier family 7(amino acid transporter),	SLC7A1	T
member 1	•	
Solute carrier family 7(amino acid transporter),	SLC7A2	Т
member 2		
Solute carrier family 7(amino acid transporter),	SLC7A7	Т
member 7		
Solute carrier family 8 (sodium/calcium	SLC8A1	T
exchanger), member 1		
Somatostatin receptor, SSTR2	SSTR2	G
Somatotrophin		G
Sonic hedgehog, SHH	SHH	G
Sorbitol dehydrogenase	SORD	Ε
Sorcin	SRI	T
SOS1 guanine nucleotide exchange factor	SOS1	G
Spastic paraplegia 7	SPG7	G
Spectrin alpha	SPTA1	S
Spectrin beta	SPTB	S
Sperm adhesion molecule	SPAM1	. G
Sperm protamine P1	PRM1	G
Sperm protamine P2	PRM2	G
Sphingomyelinase	SMPD1	Ε
Spinocerebellar ataxia 8 gene	SCA8	N
· •	DSS1	G
SRY-box 10	SOX10	G
SRY-box 11	SOX11	G
	SOX3	G
SRY-box 4	SOX4	G
SRY-box 9	SOX9	G
Stem cell factor	SCF	G

Steroid 5 alpha reductase 1 Steroid 5 alpha reductase 2 Steroid hormone receptor responsive DNA elements	SRD5A1 SRD5A2	E E G
Steroid sulphatase	STS	Е
Steroidogenic acute regulatory protein	STAR	Ť
Stromal derived factor 1	SDF1	G
Succinate dehydrogenase 1	SDH1	E
Succinate dehydrogenase 2	SDH2	E
Succinate thiokinase		Е
Succinic semi-aldehyde dehydrogenase	ssadh	Ε
Sulfamidase	SGSH	G
Sulfite oxidase	SUOX	Ε
Sulfonylurea receptor	SUR	G
Suppression of tumorigenicity 3 gene	ST3	G
Suppression of tumorigenicity 8 gene	ST8	G
Surfactant pulmonary-associated protein A1	SFTPA1	Т
Surfactant pulmonary-associated protein A2	SFTPA2	. T
Surfactant pulmonary-associated protein B	SFTPB	Т
Surfactant pulmonary-associated protein C	SFTPC	T
Surfactant pulmonary-associated protein D	SFTPD	Т
Surfeit 1	SURF1	G
Survival of motor neuron 1, telomeric	SMN1	Т
SYK-related tyrosine kinase	SRK	1
Syndecan 1	SYND1	G
Syndecan 2	SYND2	G
Syndecan 3	SYND3	G
Syndecan 4	SYND4	G
Synovial sarcoma gene 1	SSX1	G
Synovial sarcoma gene 2	SSX2	G
Talin	TLN	G
TATA binding protein	TBP TAF2A	G
TATA binding protein associated factor 2A TATA binding protein associated factor 2C2	TAF2C2	G G
TATA binding protein associated factor 2D	TAF2E	G
TATA binding protein associated factor 2F	TAF2F	G
TATA binding protein associated factor 2H	TAF2H	G
TATA binding protein associated factor 2!	TAF2I	
TATA binding protein associated factor 2J	TAF2J	G
TATA binding protein associated factor 2K	TAF2K	Ğ
Tau protein	MAPT	Š
T-BOX 1	TBX1	. G
T-BOX 2	TBX2	G
T-BOX 3	TBX3	Ğ
T-BOX 4	TBX4	Ğ
T-BOX 5	TBX5	Ğ
T-BOX 6	TBX6	G
T-cell acute lymphocytic leukemia 1	TAL1	1

T-cell acute lymphocytic leukemia 2	TAL2	ı
T-cell receptor, alpha	TCRA	i
T-cell receptor, delta	TCRD	İ
Telomerase protein component		Ē
Tenascin (cytotactin)		
Tenascin XA	TNXA	S
Terminal deoxynucleotidyltransferase, TDT		S S E
Testis-specific protein Y	TSPY	G
Thiolase, perioxisomal		E
Thiopurine S-methyltransferase	TPMT	E
Thrombopoietin	THPO	G
Thrombospondin	THBS1	G
Thromboxane A synthase 1	TBXAS1	_
Thromboxane A2	TXA2	-
Thromboxane A2 receptor	TBXA2R	ł
Thy-1 T-cell antigen	THY1	!
Thymidylate synthase	TYMS	
Thymopoletin	TMPO	E
Thyroglobulin	TG	G
Thyroid hormone receptor, alpha		G
Thyroid hormone receptor, beta	THRA	G
Thyroid peroxidase	THRB	G
•	TPO	G
Thyroid receptor auxiliary protein	TRAP	G
Thyroid-stimulating hormone receptor	TSHR	G
Thyroid-stimulating hormone, alpha	TSHA	G
Thyroid-stimulating hormone, beta	TSHB	G
Thyrotroph embryonic factor	TEF	G
Thyrotropin releasing hormone	TRH	G
Thyrotropin releasing hormone receptor	TRHR	G
Thyroxin-binding globulin	TBG	T
TIE receptor tyrosine kinase	TIE-1	G
Tip-associated protein	TAP	1
Tissue inhibitor of metalloproteinase 1, TIMP1	TIMP1	Ε
Tissue inhibitor of metalloproteinase 2, TIMP2	TIMP2	Ε
Tissue inhibitor of metalloproteinase 3, TIMP3	TIMP3	Ε
Tissue inhibitor of metalloproteinase 4, TIMP4	TIMP4	Ε
Tissue non-specific alkaline phosphatase		Ε
TNSAP	e ere	
Titin	TTN	S
Tocopherol (alpha) transfer protein	TTPA	T
Toll-like receptor 4	TLR4	i
Topoisomerase!		Ē
Topoisomerase II		Ē
Torticollis, keloids, cryptorchidism and renal	TKCR	Ğ
dysplasia gene)
Transacylase	•	E
Transcobalamin 1, TCN1		T
Transcobalamin 2, TCN2	TCN2	Ϋ́
····	, 3,12	ı

Transcription factor 1, hepatic	TCF1	G
Transcription factor 2, hepatic	TCF2	G
Transcription factor 3	TCF3	G
	TFE3	G
3		
Transcription factor, TUPLE1	TUPLE1	Ν
Transcription termination factor, RNA	TTF1	G
polymerase 1		
Transcription termination factor, RNA	TTF2	G
polymerase 2		
Transcription termination factor, RNA	TTF3	G
polymerase 3		
Transferrin	TF	G
Transferrin receptor	TFRC	G
Transforming growth factor, alpha	TGFA	G
Transforming growth factor, beta 2	TGFB2	Ğ
Transforming growth factor, beta induced	TGFBI	Ğ
Transforming growth factor, beta receptor 2	TGFBR2	Ğ
Transglutaminase 1	TGM1	Ğ
Transglutaminase 2	TGM2	G
Transglutaminase 4	TGM4	G
Transketolase	TKT	Ē
Transketolase-like 1	TKTL1	Ē
Translocation in renal carcinoma on	TRC8	Ğ
chromosome 8 gene	11.00	J
Transthyretin	TTR	Ŧ
Treacle gene	TCOF1	Ġ
Triosephosphate isomerase .	TPI1	E
Tropomyosin 1 alpha	TPM1	S
Tropomyosin 3 (non-muscle)	TPM3	S
Troponin C	11 1410	s s
Troponin I	TNNI3	S
Troponin T2, cardiac	TNNT2	S
Trypsin inhibitor	71412	E
Trypsinogen 1	TRY1	E
Trypsinogen 2	TRY2	E
Tryptophan hydroxylase	TPH	E
Tubby-like protein 1	TULP1 - And the second	
Tuberous sclerosis 1	TSC1	G
Tuberous sclerosis 2	TSC2	G
Tubulin	1502	S
Tumor susceptibility gene 101	TSG101	G
Tumour necrosis factor (TNF) receptor	TRAF1	G
associated factor 1	ITALI	1
	TBAE2	
Tumour necrosis factor (TNF) receptor	TRAF2	ı
associated factor 2	TDAE2	
Tumour necrosis factor (TNF) receptor	TRAF3	ı
associated factor 3		

Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	1
Tumour necrosis factor (TNF) receptor	TRAF5	1
associated factor 5 Tumour necrosis factor (TNF) receptor	TRAF6	
associated factor 6		
Tumour necrosis factor alpha	TNFA	1
Tumour necrosis factor alpha receptor	TNFAR	ì
Tumour necrosis factor beta	TNFB	1
Tumour necrosis factor beta receptor	TNFBR	1
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tumour protein p73	TP73	G
Tumour protein, translationally-controlled 1	TPT1	G
Tumour suppresssor gene DRA	DRA	ľ
Twist (Drosophila) homolog	TWIST	G
Tyrosinase	TYR	Ε
Tyrosinase-related protein 1	TYRP1	E
Tyrosine aminotransferase	TAT	Ε
Tyrosine hydroxylase	TH	Ε
Ubiquitin		G
Ubiquitin activating enzyme, E1		E
Ubiquitin B	UBB	· G
Ubiquitin C	UBC	G
Ubiquitin carboxyl-terminal esterase L1	UCHL1	G
Ubiquitin fusion degeneration 1-like	UFD1L	G
Ubiquitin protein ligase E3A	UBE3A	E
UDP-glucose pyrophosphorylase		E
UDP-glucuronosyltransferase 1	ugt1d, UGT1	E
UDP-glucuronosyltransferase 2	UGT2	E
Uncoupling protein 1		Т
Uncoupling protein 3	UCP3	T
Undulin 1	COL14A1	S
Uridine monophosphate kinase	UMPK	. 1
Uridine monophosphate synthetase	UMPS	1
Uridinediphosphate(UDP)-galactose-4-	GALE	E
epimerase		
Uroporphyrinogen decarboxylase	UROD	E
Uroporphyrinogen III synthase	UROS	E
Usher syndrome 2A	USH2A	S
Vascular endothelial growth factor	VEGF	G
Vasoinhibitory peptide		G
Vitamin B12-binding (R) protein	VDD	G
Vitamin D receptor	VDR	G
Vitelliform macular dystrophy, atypical gene	VMD1	T
v-myc avian myelocytomatosis viral oncogene homolog	MYC	G
Von Hippel-Lindau gene	\	_
von i iippei-cittuau gene	VHL	G

Werner syndrome helicase Wilms tumour gene 1 Wilms tumour gene 2 Wilms tumour gene 4 Winged helix nude Wingless family, wnt2 Wingless family, wnt4 Wingless family, wnt5 Wingless family, wnt7 Wingless family, wnt8 Wiskott-Aldrich syndrome protein Wnt inhibitory factor, WIF-1 Wolf-Hirschhorn syndrome candidate 1 gene Wolfram syndrome 1 gene	WRN WT1 WT2 WT4 WHN WNT2 WNT4 WNT5 WNT7 WNT8 WASP, THC WIF1 WHSC1 WFS1	0000000000-000
X (inactive)-specific transcript	XIST	G
Xanthine dehydrogenase	XDH	Ε
Xeroderma pigmentosum, complementation group A	XPA	Ε
Xeroderma pigmentosum, complementation group B	XPB	E
Xeroderma pigmentosum, complementation	XPC	Ε
group C Xeroderma pigmentosum, complementation		E
group D		
Xeroderma pigmentosum, complementation group E		Ε
Xeroderma pigmentosum, complementation group F	XPF	E
Xeroderma pigmentosum, complementation group G	ERCC5	Ε
X-ray repair gene	XRCC9	G
Xylitol dehydrogenase YY1 transcription factor	YY1	E
Zinc finger protein 198	ZIC198	G S
Zinc finger protein: 2	ZIC2	S
Zinc finger protein 3	ZIC3	S
Zinc finger protein HRX	ALL1	J
Zona pellucida glycoprotein 1	ZP1	Ġ
Zona pellucida glycoprotein 2	ZP2	G
Zona pellucida glycoprotein 3	ZP3	Ğ
Zona pellucida receptor tyrosine kinase	ZRK	Ğ
Zonadhesin	ZAN	Ğ
•		

In a thirteenth aspect.

SKIN, MUSCLE, CONNECTIVE TISSUE AND BONE.

The present invention relates to a method of assessing the risk of developing clinical or social consequences following dysfunction, damage or disease of the skin, muscle, connective tissue or bone and indicating appropriate therapeutic interventions.

The skin, muscle, connective tissue and bone constitute the scaffolding of the body, their structural properties enable the body to maintain its shape, allow articulation and movement of limbs and act as anchor points for the location and attachement of other organs.

The skin forms the initial defensive barrier between the body and the external environment. It consists of the epidermis (containing the sweat and apocrine glandsand dermis lying on a layer of fat. Within these layers lie a series of specialised cells such as dendritic cells, Langehans cells and intermediate cells. The skin is also richly supplied with nerves and blood vessels. Together these tissues enable the skin to present a supple but sensitive barrier between the external environment and the body. The skin is exposed to pathogens and injury at all times and as such it has impressive defensive, repair and regenerative capacities. In order to facilitate these functions the skin cells 'turn over' in about 30 days, thus ensuring a continuous process of renewal and the maintenance of an efficient barrier. The skin is also responsible for the detection of environmental stimuli such as heat, cold, pressure and antigen detection. The skin can also manifest the body's responses to such stimuli by enabling heat loss through vasodilation or resistance to infection by focal inflammatory responses. In humans the skin plays an important part in sexual attraction and this has very significant implications for the extent and nature of disabilities experienced or percieved following dysfunction, damage or disease.

The most common forms of skin diseases are; acne, warts, tumours, dermatitis. psoriasis, leg ulcers and infections (bacterial, viral and fungal). There are also a host of rarer genetic or metabolic disorders including: epidermolysis bullosa, neurofibromatosis, ichthyosis vulgaris, Down's syndrome, atopic eczema, acne vulgaris, alopecia areata, Werners syndrome etc. (Weatherall, Leadingham and Warrell 1996).

One particular aspect of the presence of diseases of the skin is the social stigma and isolation which arise as a consequence of them. Although seldom life threatening, the disability and decline in quality of life experienced by the patient is often out of all proportion to the clinical severity of the condition.

Muscle tissues supply the physical power to move the limbs of the body and to enable more discrete processes such as peristalsis, breathing and ejaculation. Muscle is made up of muscle fibres (multinucleate cells containing myofibrils, sarcoplasm, mitochondria, ribosomes and the sarcotubular system). Each fibre his enclosed in a sarcolemmal sheath and has a motor endplate where nerve fibres terminate. The muscle fibres work in groups to ensure a co-ordinated application of force.

Pain, muscular weakness and fatiguability are the most important symptoms of dysfunction, damage and disease of the muscle. In order to arrive at a specific diagnosis of a disease or syndrome the distribution, nature and dynamics of the muscular symptoms must be carefully assessed (e.g. genetic causes of muscular disease tend to have an insidious progression of muscle weakness, whereas inflammatory causes occur more rapidly).

Diseases of muscle include genetic causes (the dystrophies, myotonias), hypotonias of uncertain cause, inflammatory myopathies, disorders of neuro-muscular transmission (e.g. myasthenia gravis, Lambert-Eaton myasthenic syndrome) and mitochondrial, metabolic or endocrine related myopathies.

In addition muscular symptoms can often occur as a presenting symptom in neurological diseases such as multiple sclerosis, motor neurone disease and Parkinson's disease. Adverse reactions to drug therapies can also result in the symptoms of muscle disease (e.g.antibiotics, procainamide, D-penicilamine).

Connective tissues form the thin membranes of tissue which encompass and link the various organs and tissues of the body together, They form support structure for the organs and the vascular, nervous and lymphatic vessels and fibres which run between them. Connective tissues consist largely of collagen, laminins and fibronectins.

Diseases of connective tissue form a diverse group of syndromes many of which are of unknown etiology e.g. systemic lupus erythematosus, scleroderma, vasculitidies and Sjogren's syndrome). These diseases have a common trand of pathology in that they all involve aberrant activation or regulation of the immune system. Several can be prcipitated or excaberated by certain drugs or exposure to environmental toxins. The symptoms diffuse and often involve several systems (e.g. arthralgias, myalgias, skin rashes, hair loss, breathlesness etc.) Diagnosis can be difficult particularly in the more diffuse presentations, the presence of antinuclear antibodies is often helpful in confirming a diagnosis. These conditions are thought to be triggered, in the main, by responses to external environmental factors.

Rheumatology concerns the pathological process which affect joints and periarticular tissues. It involves diseases of the musculo-skeletal system such as genetic abnormalities of specific component tissues, abnormalities of the immune system, acute and chronic inflammatory responses and the turnover and regulation of connective tissues (e.g. bone, cartilage). The World Health Organisation classifies rheumatic disorders into four main categories:

Back pain

Periarticular disorders

Osteoarthritis and related disorders

Inflammatory arthropathies (e.g. rheumatoid arthritis, ankylosing spondylitis)

Rheumatic disorders are very common and the experience of pain in muscles or joints is one of the commonest reasons for consulting a doctor. Since joint or muscle pain is a feature of physical exertion and exercise it is sometimes difficult to draw the

boundary between 'normal' and 'pathological' joint and muscle pain. Given the frequency of this type of complaint the economic consequences of such disorders are immense and they are calculated to be responsible for 30% of the burden of disability in the population (rising to over 60% in the ageing population).

Rheumatic disorders present with a variety of symptoms both articular (e.g. pain, stiffness, swelling and loss of function in joints) and extra-articular (e.g. scleritis, systemic sclerosis, xerostomia, psoriasis, ulcerative colitis, urethritis, peripheral neuropathies). A careful clinical examination is required to determine the range of symptoms present and thus the exact diagnosis (e.g. whether arthritis is due to a bacterial infection).

Bone is one of two tissues in the body (teeth are the other) which is mineralised in order to carry out its normal functions, to act as a rigid framework for muscle and organ attachement and to act as a mineral store. Bone tissue consists of cells and an extracellular mineralised matrix. Three types of cells are present, osteoblasts, osteoclasts and osteocytes. All three types are involved in the complex processes of bone formation and resorption. In addition these cells have close contacts with bone marrow and thus the immune system. Bone metabolism is affected by factors such as mechanical stress, hormones and inflammatory mediators such as cytokines. The process of bone re-modelling continues throughout life and as such will be affected by concurrent illness or hormonal changes during ageing (e.g. osteoporosis is a common problem in post-menopausal women).

In addition to the damage caused by fractures, infections and tumours bone has a number of other pathologies including Weatherall, Leadingham and Warrell 1996): Aberrations of bone formation or resorption (osteoporosis, osteomalacia, Paget's disease)

Defects in the main molecular components of bone formation (Marfan's syndrome, osteogenesis imperfecta)

Disorders of the enzymes of bone metabolism (homocystinuria, hypophosphatasia) Skeletal chondroplasias

Abberant biology of bone cells (osteopetrosis, ectopic ossification, fibrous dysplasia) Toxic effects due to excess minerals, vitamins or metallic poisons.

The main consequences of these disorders involve, unsightly lesions, sores, ulcerations, infections, musculoskeletal pain, stiffness, reduced mobility, dysfunction of specific organs, physical disability and enhanced susceptibility to fractures. These physical features will impact on an individuals quality of life and as such the disorder is often complicated by complex interactions with an individuals social circumstances and psychology (Weatherall, Leadingham and Warrell 1996).

The physiology and structure of skin, muscle, connective tissue and bone is extremely complex and involves the initiation of repair and regenerative mechanisms and the body's response to changes in the environment (e.g. changes in physical activity leading to increased muscle mass and bone density or muscular changes in pregnancy). The co-ordination of a changing pattern of behaviour or environmental stressor with musculoskeletal changes or the initiation of wound closure and healing

following trauma involve synergistic or inhibitory interaction between multiple regulatory pathways and molecular cascades. Variation in the functionality of the proteins involved in these processes will, inevitably, cause or have an impact on the functioning of these systems or an individuals attempts to minimise damage and restore function following dysfunction, damage or disease in these systems. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from dysfunction, damage or disease of the skin, muscle, connective tissue or bone including genetic history, age, sex, nutritional status, pre-existing disease or injury, drug treatments and socio-economic circumstances. Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to the occurrence of skin, muscle, connective tissue and bone pathology and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at the heart of the difficulties experienced in the healthcare and social management of dysfunction, damage or disease of the skin, muscle, connective tissue or bone.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

SKIN, BONE, MUSCLE GENE LIST	HUGO symbol	Protein function
17beta hydroxysteroid oxidoreductase		E
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	Ε
6-phosphofructo-2-kinase	PFKFB1	E
Acetoacetyl 2-CoA-thiolase	ACAT2	E
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N

Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Achromatopsia 2	ACHM2	S
Acid phosphatase 2, lysosomal	ACP2	E
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Actin, beta	ACTB	S
Actin, gamma 2	ACTG2	S
Activin		G
Acyl CoA dehydrogenase, short chain	ACADS	E
Acyl-CoA thioesterase		Ē
Adaptin, beta 3A	ADTB3A	Ŧ
Adducin, alpha	ADD1	S
Adducin, beta	ADD2	S
Adenosine deaminase	ADA	E
Adenosine monophosphate deaminase	AMPD	Ē
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N N
Adenosine receptor A3	ADORA3	N
Adenyl cyclase		N
Adenylate cyclase 1	ADCY1	E
Adenylate cyclase 2	ADCY2	Ē
Adenylate cyclase 3	ADCY3	Ē
Adenylate cyclase 4	ADCY4	Ē
Adenylate cyclase 5	ADCY5	Ē
Adenylate cyclase 6	ADCY6	Ē
Adenylate cyclase 7	ADCY7	Ē
Adenylate cyclase 8	ADCY8	Ē
Adenylate cyclase 9	ADCY9	E
Adenylate kinase	AK1	Ē
Adenylosuccinate lyase	ADSL	Ē
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	samsan Nilli
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	G
Adrenoleukodystrophy gene	AL D	_
Alanine aminotransferase	ALD	E
Alanine-glyoxylate aminotransferase	ACVT	<u>T</u>
Albumin, ALB	AGXT	E
Alcohol dehydrogenase 1	ALB	Ţ
Thomas demydiogenase 1	ADH1	Ε

Alcohol dehydrogenase 3 Alcohol dehydrogenase 4 Alcohol dehydrogenase 5 Alcohol dehydrogenase 6 Alcohol dehydrogenase 7 Aldehyde dehydrogenase 1 Aldehyde dehydrogenase 10 Aldehyde dehydrogenase 2 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 7 Aldolase A Aldolase B Aldolase C Aldosterone receptor Alkaline phosphatase, liver/bone/kidney Alkaptonuria gene Alkylglycerone phosphate synthase alpha tectorin alpha thalassemia gene alpha1-antichymotrypsin alpha2-antiplasmin alpha2-antiplasmin alpha-actinin 2 alpha-actinin 3 alpha-Galactosidase A Alpha-galactosidase B, GALB alpha-synuclein Amelogenin Aminopeptidase P Amphiregulin Amylo-1,6-glucosidase Amyloid beta A4 precursor protein Amyloid beta A4 precursor-like protein Androgen binding protein Androgen receptor Angiopoietin 1 Angiopoietin 2 Angiotensin converting enzyme Angiotensinogen Antidiuretic hormone receptor Anti-Mullerian hormone Apolipoprotein A 4	ADH2 ADH3 ADH4 ADH5 ADH6 ADH7 ALDH1 ALDH10 ALDH2 ALDH5 ALDH6 ALDH7 ALDOA ALDOB ALDOC MLR ALPL AKU AGPS TECTA ATRX AACT PI PLI ACTN2 ACTN3 GLA NAGA SNCA AMELX XPNPEP2 AREG AGL APP APLP ABP AR ANGPT1 ANGPT2 ACE, DCP1 AGT ADHR AMH APOA4	
Apolipoprotein A I Apolipoprotein A II	APOA4 APOA1 APOA2	T T T
Apolipoprotein B Apolipoprotein C1	APOB APOC1	T T
to the Errane And	551	ı

Apolipoprotein C2 Apolipoprotein C3 Apolipoprotein D Apolipoprotein E Apolipoprotein H Arginine vasopressin Arginine vasopressin receptor 1A Arginine vasopressin receptor 1B Arginine vasopressin receptor 2 Arrestin Aryl hydrocarbon receptor nuclear	APOC2 APOC3 APOD APOE APOH AVP AVPR1A AVPR1B AVPR2 SAG ARNT	T T T T N N N N S T
translocator	A D O A	_
Arylsulfatase A Arylsulfatase B	ARSA	E
Arylsulfatase C	ARSB ARSC1	Ε
Arylsulfatase D	ARSD	E
Arylsulfatase E	ARSE	E
Arylsulfatase F	ARSF	E
Aspartate receptor	711101	Ň
Aspartoacylase	ASPA	E
Aspartylglucosaminidase	AGA	E
Ataxia telangiectasia complementation group	ATD, ATDC	Ğ
D		
Ataxia telangiectasia gene, AT	ATM	G
ATP cobalamin adenoxyltransferase		Ε
ATP sulphurylase	atpsk2	Ε
ATP/ADP translocase		E
Attractin		ŀ
Autoimmune regulator, AIRE	AIRE	ı
BCL2-related protein A1	BCL2A1	G
Benzodiazepine receptor		Ν
Bestrophin	VMD2	T
beta 2 microglobulin	B2M	- 1
beta-endorphin receptor beta-galactosidase	01.04	N
beta-Glucuronidase	GLB1	E
beta-synuclein	GUSB	E
Bilirubin UDP-glucuronosyltransferase	SNCB	N
Bloom syndrome protein	BLM	E
Blue cone pigment	BCP	G
Bone morphogenetic protein, BMP1	BMP1	S
Bone morphogenetic protein, BMP2	BMP2	G
Bone morphogenetic protein, BMP3	BMP3	G
Bone morphogenetic protein, BMP4	BMP4	G
Bone morphogenetic protein, BMP5	BMP5	G G
Bone morphogenetic protein, BMP6	BMP6	G
Bone morphogenetic protein, BMP7	BMP7	G
Bone morphogenetic protein, BMP8	BMP8	G
	0	J

Bradykinin receptor B1 Bradykinin receptor B2 Branched chain aminotransferase 1, cytosolic Branched chain aminotransferase 2,	BCAT1 BCAT2	I E E
mitochondrial Breast cancer, ductal, 1 Breast cancer, ductal, 2 Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch	BRCD1 BRCD2 BCHE ATP2A1	G G E T
Ca(2+) transporting ATPase, slow twitch Cadherin E Cadherin EP	ATP2A2 CDH1	T G G
Cadherin N Cadherin P Calbindin 1	CDH2 CDH3 CALB1	G G G
Calbindin D9K Calcitonin receptor /Calcitonin gene-related peptide receptor	CALB3 CALCR	G N
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	Ν
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	Ν
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	Ν
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calnexin	CANX	G
Calpain	CAPN, CAPN3	Ε
Cannabinoid receptor	CNR1	Ν
Carbonic anhydrase 3	CA3	E
Carbonic anhydrase 4	CA4	Ε
Carbonic anhydrase, alpha	CA1	Ε
Carbonic anhydrase, beta	CA2	Ε
Carnitine acetyltransferase	CRAT	E
Carnitine acylcarnitine translocase	CACT	Ε
Carnitine palmitoyltransferase I	CPT1A	Ε
Carnitine palmitoyltransferase II	CPT2	Ε
Carnitine transporter protein	CDSP, SCD	T
Cartilage oligomeric matrix protein	COMP, EDM1, PSACH	Ν
Cartilage-hair hypoplasia gene	CHH	Ν
Catenin, beta	CTNNB1	G
Cathepsin K	CTSK	Ε
Caveolin 3	CAV3	Ε
CD1	CD1	ĺ
CD4	CD4	i
Ceroid lipofuscinosis neuronal 3	CLN3	Ν

Contoniosmin	-	
Ceruloplasmin precursor	CP	E
Chemokine MCAF	MCAF	1
Chloride channel 1, skeletal muscle	CLCN1	S
Cholecystokinin	CCK	N
Cholecystokinin B receptor	CCKBR	N
Cholesterol ester hydroxylase		E
Choline acetyltransferase	CHAT	Ε
Choroideremia gene	СНМ	S
Citrate synthase		Ε
Clathrin		Т
Cleft palate gene	CPX	G
Cockayne syndrome gene, CKN1	CKN1	G
Coenzyme Q (CoQ)/ubiquinone		Ē
Collagen I aipha 1	COL1A1	E S
Collagen i alpha 2	COL1A2	S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	Š
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	S
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	S
Collagen IV alpha 6	COL4A6	S
Collagen IX alpha 2	COL9A2, EDM2	S
Collagen IX alpha 3	COL9A3	S
Collagen receptor	COLR	9
Collagen V alpha 1	COL5A1	S S
Collagen V alpha 2	COL5A2	S
Collagen VI alpha 1	COL6A1	9
Collagen VI alpha 2	COL6A2	S S
Collagen VI alpha 3	COL6A3	S
Collagen VII alpha 1	COL7A1	S
Collagen X alpha 1	COL10A1	S
Collagen X alpha 1	COL11A1	S
Collagen XI alpha 2	COL11A2	
Collagen XVII alpha 1	COL17A1	S
Collagenic-like tail subunit of asymmetric	COLQ	S
acetylcholinesterase		E
Collapsin		<u> </u>
Colony-stimulating factor 1	CSF1	G
Colony-stimulating factor 1 receptor	CSF1R	G
Colony-stimulating factor 2	CSF2	G
Colony-stimulating factor 2 alpha receptor	CSF2RA	G
Colony-stimulating factor 2 beta receptor	CSF2RA CSF2RB	G
Colony-stimulating factor 3	CSF3	G
Colony-stimulating factor 3 receptor		G
Complement component C1 inhibitor	CSF3R	G
Complement component C1 inhibitor	C1NH	ļ
Complement component C (da	C1QA	1

C1QB C1QG C1R C1S C2 C3 C4A C4B C5 C6 C7 C8B C9 CR1 CR2 CR3	
	E
•	. E
	Ē
MTATP6	Ē
CRX	G
CPO	E.
CBFA1	G
CBFA2	G
	G
CBG	N
2211	Ţ
	<u>T</u>
CRHR1	T
	j
CKBE	
_	E G
	S
	· S
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	· · · · · · · · · · · · · · · · · · ·
	Ğ
	· E
ATP7B	· E
CREB	G
PKA	E
PDE1B	Ε
PDE1B1	E
PDE2A3	Ε
PDE3A PDE3B	E E
	C1QG C1R C1S C2 C3 C4A C5 C6 C7 C8B C9 CR1 CR2 CR3 MTATP6 CRY CBFA1 CBFA2 CBFB CBFB CRYAA CRYAB CRYAA CRYAB CRYAA

Cyclic nucleotide phosphodiesterase 8 PDE8 Cyclic nucleotide phosphodiesterase 9A PDE9A Cyclin-dependent kinase 2 CDK2 Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	
Cyclin-dependent kinase inhibitor 2A (p16) CDKN2A Cyclooxygenase 1 COX1 Cyclooxygenase 2 COX2 CYP11A1 CYP11B1 CYP11B1 CYP11B1 CYP11B2 CYP11B2 CYP17 CYP17 CYP19 CYP19 CYP1A1 CYP1A1 CYP1A2 CYP1A2 CYP1B1 CYP1B1 CYP21 CYP24 CYP24 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP27 CYP24 CYP24 CYP24 CYP24 CYP24 <	

CYP51	CYP51	Ε
CYP5A1	CYP5A1	Ē
CYP7A	CYP7A	E
CYP8	CYP8	E
Cystathionase	CTH	E
Cystathione beta synthase	CBS	Ē
Cystic fibrosis transmembrane conductance	CFTR	N
regulator, CFTR	OI III	IV
Cystinosin	CTNS	Т
Cytidine deaminase	CDA	Ē
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytochrome a	•	E
Cytochrome b-245 alpha	CYBA	E
Cytochrome b-245 beta	CYBB	E
Cytochrome b-5	CYB5	E
Cytochrome c	0.20	E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	CSBP1	
binding protein 1		ı
Cytokine-suppressive antiinflammatory drug-	CSBP2	1
binding protein 2		1
DAX1 nuclear receptor	DAX1	
Deafness dystonia peptide	DDP	N
Delta 4-5 alpha-reductase		E
Delta aminolevulinate dehydratase	ALAD	Ē
Delta(4)-3-oxosteroid 5-beta-reductase		Ē
Delta-7-dehydrocholesterol reductase	DHCR7	E
Dentin sialophosphoprotein	DSPP	Ğ
Desmin	DES	Š
DHEA sulfotransferase	STD	E
Diastrophic dysplasia sulfate transporter	DTD	T
Dihydrolipoamide dehydrogenase	DLD	N
Dihydroxyacetonephosphate acyltransferase	DHAPAT	E
DNA damage binding protein, DDB1	DDB1	s
DNA damage binding protein, DDB2	DDB2	S
DNA methyltransferase	DNMT	E
DNA-damage-inducible transcript 3	DDIT3	s
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	N
Dopamine receptors D5	DRD5	N
Dynamin	DNM1	G
Dynorphin receptor		N
Dyskerin	DKC1	S
Dystonia 1	DYT1	S
Dystonia 3	DYT3	S
Dystonia 6	DYT6	S
•	- · · · -	_

Dystonia 7 Dystrophia myotonica Dystrophia myotonica, atypical Dystrophin	DYT7 DM, DMPK DM2 DMD	S E S
Dystrophin-associated glycoprotein 35kD, SCGD	SGCD	S
Dystrophin-associated glycoprotein 35kD, SGSG	SGCG	S
Dystrophin-associated glycoprotein 43kD Dystrophin-associated glycoprotein 50kD Ectodermal Dysplasia 1 gene Elastase 1 Elastase 2 Elastin Electron-transfering-flavoprotein alpha Electron-transfering-flavoprotein beta Electron-transferring flavoprotein dehydrogenase	SGCB SGCA ED1 ELAS1 ELAS2 ELN ETFA ETFB ETFDH	S S S E E S T T E
Emerin Endocardial fibroelastosis 2 gene Endometrial bleeding-associated factor Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Engrailed-1 Engrailed-2 Enolase Enoyl CoA hydratase Enoyl CoA isomerase	EMD EFE2 EBAF EDN1 EDN2 EDN3 ECE1 EDNRA EDNRA EDNRB EN1 EN2 EN01	TSGNNNNNSG田田田口
Enoyl CoA reductase Enterokinase Ephrin receptor tyrosine kinase A Ephrin receptor tyrosine kinase B Epidermal growth factor Epidermal growth factor receptor Erythrocyte membrane protein band 4.1 Erythropoietin Erythropoietin receptor Estrogen receptor Estrogen receptor Exostosin 1 Exostosin 2 Exostosin 3 Eye colour gene 3 (brown) Eyes absent 1 Faciogenital dysplasia	PRSS7, ENTK EPHA EPHB EGF EGFR EPB41 EPO EPOR ESR EXT1 EXT2 EXT3 EYCL3 EYA1 EGD1 EGDY	EEGGGG8G88886T
Faciogenital dysplasia	FGD1, FGDY	-

Factor 1 (No. one)	F1	ı
Factor B, properdin		- 1
Factor D		- 1
Factor H	HF1	- 1
Factor X	F10	1
Fanconi anemia, complementation group A	FANCA	Т
Fanconi anemia, complementation group C	FANCC	Т
Fanconi anemia, complementation group D	FANCD	T
Fc fragment of IgG, high affinity IA, receptor	FCGR1A	G
for		
Fc fragment of IgG, low affinity IIa, receptor	FCGR2A	G
for (CD32)		•
Ferritin, H subunit		Т
Ferritin, L subunit	FTL	Ť
Fibrillin 1	FBN1	Ġ
Fibrillin 2	FBN2	G
Fibrinogen alpha	FGA	S
Fibrinogen beta	FGB	S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
Flightless-II, Drosophila homolog of	FLII	G
Folic acid receptor	FOLR	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Forkhead transcription factor 10	FKHL10	G
Forkhead transcription factor 14	FKHL14	G
Forkhead transcription factor 7	FKHL7	
Fragile site, folic acid type, rare, fra(X) A	FRAXA	G
Frataxin	FRDA	N
Fringe secreted protein, lunatic	LFNG	G
Fringe secreted protein, manic		G
Fringe secreted protein, manic Fringe secreted protein, radical	MFNG RFNG	G
Fructose-1,6-diphosphatase	FBP1	G
Fucosidase alpha-L-1	FUCA1	E
Fucosidase alpha-L-2	FUCAT	E
•	ECMD	E
Fukuyama type congenital muscular	FCMD	G
dystrophy Fumarase	Tt I	_
	FH	Ε
GABA receptor, alpha 1	GABRA1	N
GABA receptor, alpha 2	GABRA2	N
GABA receptor, alpha 3	GABRA4	N
GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	Ν

GABA receptor, beta 2 GABA receptor, beta 3 GABA receptor, gamma 1 GABA receptor, gamma 1 GABA receptor, gamma 2 GABA receptor, gamma 2 GABA receptor, gamma 3 Galactocerebrosidase Galactokinase Galactose 1-phosphate uridyl-transferase Gamma-glutamyl carboxylase Gap junction protein alpha 3 Gap junction protein alpha 8 Gap junction protein beta 3 Gastrointestinal tumor-associated antigen 1 Gastrulation brain homeobox 2 Glucosidase, acid alpha Glucosidase, acid beta Glutamate receptor 1 Glutamate receptor 2 Glutamate receptor 3 Glutamate receptor 4 Glutamate receptor 5 Glutamate receptor 5 Glutamate receptor, ionotropic, NMDA 1 Glutamate receptor, ionotropic, NMDA 2A Glutamate receptor, ionotropic, NMDA 2B Glutamate receptor, ionotropic, NMDA 2D Glutamate receptor, ionotropic, NMDA 2D Glutamate receptor, ionotropic, NMDA 2D Glutamate receptor, ionotropic, NMDA 2D Glutamate receptor, ionotropic, NMDA 2D Glutathione Glutathione Glutathione S-transferase, GSTZ1 Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GABRB1 GABRB2 GABRB3 GABRG1 GABRG2 GABRG3 GALC GALK1 GALT GGCX GJA3 GJA8 GJA8 GJB3 GA733 GBX2 GAA GBA GLUR1 GLUR2 GLUR3 GLUR4 GLUR5 GLUR5 GLUR5 GLUR5 GLUR6 GLUR7 NMDAR1 NMDAR1 NMDAR2A NMDAR2A NMDAR2D GSH GPX1 GSTZ1 GAPDH		222222111111111111111111111111111111111
Glycerol kinase	GK		_
Glycinamide ribonucleotide (GAR)	GART		E
transformylase			
	GLRA2	4	N.
Glycine receptor, beta		• •	· N
Glycine transporter	GLYT		Ν
Glycogen phosphorylase	PYGL		Ε
Glycosyltransferases, ABO blood group	ABO		E
GM2 ganglioside activator protein, GM2A	GM2A		Ε
Green cone pigment	GCP		S
Growth arrest-specific homeobox	GAX		G
Growth factor receptor-bound protein 2	GRB2		G
Growth hormone 1	GH1		G
Growth hormone 2 (placental)	GH2		G

Growth hormone receptor Growth hormone releasing hormone (GHRH) Growth hormone releasing hormone receptor Growth/differentiation factor 5 GTP cylcohydrolase 1 GTPase-activating protein, GAP Guanidinoacetate N-methyltransferase Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GHR GHRH GHRHR GDF5 GCH1 RASA1 GAMT GNAO1	GGGGGGEZ
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAI1	GNAI1	N
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNAI2	GNAI2	N
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNAI3	GNAI3	N
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	Ν
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	Ν
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	N
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	N
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNAT1	Ν
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	N
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	Ν
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	Ν
polypeptide	GNAQ	Ν
specific)	GUCY2D	Ε
H(+), K(+) - ATPase Haeme regulated inhibitor kinase	GUCA1A ATP4B HBA1	ENET
Haemoglobin alpha 2	HBA2	Т
•	HBB HBD	T T
	HBG1	T
	HBG2	Ť
<u> </u>	HBGG	Ť
	HR	G
Heat shock protein, HSP60 Heat shock protein, HSP70		1

Heat shock protein, HSP90		1
Heat shock protein, HSPA1		Í
Heat shock protein, HSPA2		i
Heparan sulfamidase		Ė
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	Ī
Hepatocyte growth factor	HGF	Ġ
Hermansky-pudlak syndrome gene	HPS	Ţ
Hexokinase 2	HK2	
Hexosaminidase A	HEXA,TSD	Ε
Hexosaminidase B	HEXB	E
Histamine receptors, H1	ПЕЛЬ	E -
Histamine receptors, H2		N
*		N
Histamine receptors, H3	DATA	N
HLA-B associated transcript 1	BAT1	1
Holocarboxylase synthetase	HLCS	E
Holoprosencephaly 1	HPE1	G
Holoprosencephaly 2	HPE2	G
Holoprosencephaly 3	HPE3	G
Holoprosencephaly 4	HPE4	G
Homeobox (HOX) gene A1	HOXA1	G
Homeobox (HOX) gene A10	HOXA10	G
Homeobox (HOX) gene A11	HOXA11	G
Homeobox (HOX) gene A12	HOXA12	G
Homeobox (HOX) gene A13	HOXA13	G
Homeobox (HOX) gene A2	HOXA2	G
Homeobox (HOX) gene A3	HOXA3	G
Homeobox (HOX) gene A4	HOXA4	G
Homeobox (HOX) gene A5	HOXA5	G
Homeobox (HOX) gene A6	HOXA6	G
Homeobox (HOX) gene A7	HOXA7	Ğ
Homeobox (HOX) gene A8	HOXA8	Ğ
Homeobox (HOX) gene A9	HOXA9	Ğ
Homeobox (HOX) gene B1	HOXB1	G
Homeobox (HOX) gene B2	HOXB2	G
Homeobox (HOX) gene B3	HOXB3	G
Homeobox (HOX) gene B4	HOXB4	G
Homeobox (HOX) gene B5	HOXB5	G
Homeobox (HOX) gene B6	HOXB6	G
Homeobox (HOX) gene B7	HOXB7	G
Homeobox (HOX) gene B8	HOXB8	G
Homeobox (HOX) gene B9	HOXB9	
Homeobox (HOX) gene C13		G
· · · · · · · · · · · · · · · · · · ·	HOXC13	G
Homeobox (HOX) gene C4	HOXC4	G
Homeobox (HOX) gene C8	HOXC8	G
Homeobox (HOX) gene C9	HOXC9	G
Homeobox (HOX) gene D1	HOXD1	G
Homeobox (HOX) gene D10	HOXD10	G

Homeobox (HOX) gene D12	HOXD12	3
Homeobox (HOX) gene D13	HOXD13	3
Homeobox (HOX) gene D3	HOXD3	3
Homeobox (HOX) gene D4	HOXD4	3
Homeobox (HOX) gene D8	HOXD8	3
Homeobox (HOX) gene D9		3
Homeobox 11		3
Homeobox HB24		3
Homeobox HB9	· · · · · · · · · · · · · · · · · · ·	3
Homeobox, PROX1		3
Homogentisate 1,2 dioxygenase	•	=
Human placental lactogen		- 3
Hypoxia inducible factor 1	HIF1A E	=
Hypoxia inducible factor 2	F	=
IC7 A and B		- I
Immunoglobulin E (IgE) reponsiveness gene		
Indian hedgehog, ihh		3
Inhibin, alpha	INHA	
Inhibin, beta A		3
Inhibin, beta B		3
Inhibin, beta C		э Э
Inositol 1,4,5-triphosphate receptor 3	ITPR3	3
Insulin promotor factor 1	IPF1	, ,
Insulin-like growth factor 1	IGF1	3
Insulin-like growth factor 1 receptor	IGF1R .	
Insulin-like growth factor 2	IGF2	
Insulin-like growth factor 2 receptor	IGF2R	
Integrin beta 1	ITGB1	
Integrin beta 3	ITGB3	
Integrin beta 4	ITGB4	
Integrin, alpha 5	ITGA5	
Integrin, alpha 7	ITGA7	
Inter-alpha-trypsin inhibitor, IATI		
Interferon alpha	IFNA1 I	
Interferon beta	IFNB I	
Interferon gamma	IFNG I	
Interferon gamma receptor 1	IFNGR1 I	
Interferon gamma receptor 2	IFNGR2	
Interferon regulatory factor 1	IRF1 I	
Interferon regulatory factor 4	IRF4	
Interleukin(IL) 1 receptor	IL1R I	
Interleukin(IL) 1, alpha	IL1A I	
Interleukin(IL) 1, beta	IL1B	
Interleukin(IL) 10	IL10	
Interleukin(IL) 10 receptor	IL10R	
Interleukin(IL) 11	IL11	
Interleukin(IL) 11 receptor	IL11R I	
Interleukin(IL) 12	IL12	
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Interloukin/II \ 12 recentor hata 4	IL12RB1	
Interleukin(IL) 12 receptor, beta 1	-	
Interleukin(IL) 13	IL13	
Interleukin(IL) 13 receptor	IL13R	
Interleukin(IL) 2	IL2	
Interleukin(IL) 2 receptor, alpha	IL2RA I	
Interleukin(IL) 2 receptor, gamma	IL2RG	
Interleukin(IL) 3	IL3	
Interleukin(IL) 3 receptor	IL3R I	
Interleukin(IL) 4	IL4	
Interleukin(IL) 4 receptor	IL4R	
Interleukin(IL) 5	IL5 1	
Interleukin(IL) 5 receptor	IL5R I	
Interleukin(IL) 6	IL6	
Interleukin(IL) 6 receptor	IL6R I	
Interleukin(IL) 7	IL7	
Interleukin(IL) 7 receptor	IL7R	
Interleukin(IL) 8	IL8	
Interleukin(IL) 8 receptor	IL8R	
Interleukin(IL) 9	IL9	
Interleukin(IL) 9 receptor	IL9R	
· · · · · · · · · · · · · · · · · · ·	IL1RN, IL1RA	
Interleukin(IL) receptor antagonist 1		
Isocitrate dehydrogenase	E	
Kallman syndrome gene 1	KAL1 G	
Keratin 1	KRT1 S KRT10 S	
Keratin 10	KRT10 S	
Keratin 11	KRT11 S	
Keratin 12	KRT12 S	
Keratin 13	KRT13 S	
Keratin 14	KRT14 S	
Keratin 15	KRT15 S	
Keratin 16	KRT16 S	
Keratin 17	KRT15 S KRT16 S KRT17,PCHC1 S KRT18 S KRT2 S	
Keratin 18	KRT18 S	
Keratin 2	KRT2 S	
Keratin 3	KRT3 S	
Keratin 4	KRT4 S	
Keratin 5	KRT5 S	
Keratin 6	KRT6	
Keratin 7	KRT7 S	
Keratin 8	KRT8 S	
Keratin 9	KRT9 S	
Keratin, hair acidic 1	KRTHA1 S	
Keratin, hair basic 2	KRTHB1 S	
Keratin, hair basic 2 Keratin, hair basic 6	KRTHB6 S	
·		
Kininogen, High molecular weight	·	
Lactate dehydrogenase, A	LDHA E	
Lactate dehydrogenase, B	LDHB E	
Lamin A/C	LMNA G	

Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	Ğ
Laminin 5, gamma 2	LAMC2	Ğ
Laminin M	LAMM	Ğ
Laminin receptor 1	LAMR1	Ğ
Latent transforming growth factor-beta	LTBP2	Ğ
binding protein 2		•
Leukocyte-specific transcript 1	LST-1	1
Leukotriene A4 hydrolase		i
Leukotriene A4 synthase	LTA4S	Ė
Leukotriene B4 receptor		- 1
Leukotriene B4 synthase	LTB4S	Ē
Leukotriene C4 receptor		ī
Leukotriene C4 synthase	LTC4S	E
LIM homeobox transcription factor 1, beta	LMX1B	Ğ
Limb girdle muscular dystrophy 1A	LGMD1A	Ğ
Limb girdle muscular dystrophy 1B	LGMD1B	Ğ
Limb girdle muscular dystrophy 2G	LGMD2G	Ğ
Limb girdle muscular dystrophy 2H	LGMD2H	Ğ
Limbic associated membrane protein	LAMP	Ğ
Lipoprotein receptor, Low Density	LDLR	T
Lipoxygenase 12 (platelets)	LOG12	i
Loricrin	LOR	s
Low density lipoprotein receptor-related	LRP	T
protein precursor		•
Luteinizing hormone-releasing hormone		Ν
Luteinizing hormone-releasing hormone		N
receptor		
lymphotoxin		1
Lysosome-associated membrane protein 1	LAMP1	Ġ
Lysosome-associated membrane protein 2	LAMP2	G
Lysozyme	LYZ	1
Lysyl hydroxylase	PLOD	Е
Lysyl oxidase	LOX	E
Macrophage activating factor	MAF	Ī
Macrophage inflammatory protein-1	MIP1	Ì
Macrophage inflammatory protein-1 receptor		Ì
Macrophage inflammatory protein-2	MIP2	i
Macrophage inflammatory protein-2 receptor		İ
MADS box transcription-enhancer factor 2A	MEF2A	Ġ
MADS box transcription-enhancer factor 2B	MEF2B	Ğ
MADS box transcription-enhancer factor 2C	MEF2C	Ğ
MADS box transcription-enhancer factor 2D	MEF2D	Ğ
Mannose binding protein	MBP	i
Mannosidase, alpha B lysosomal	MANB	Ė
Mannosidase, beta A lysosomal	MANBA	E
Marenostrin	MEFV	T
Matrix Gla protein	MGP	Ġ
		-

Matrix metalloproteinase 1	MMP1	E
Matrix metalloproteinase 10	MMP10	E
Matrix metalloproteinase 11	MMP11	E
Matrix metalloproteinase 12	MMP12	E
Matrix metalloproteinase 13	MMP13	E
Matrix metalloproteinase 14	MMP14	E
Matrix metalloproteinase 15	MMP15	
Matrix metalloproteinase 16	MMP16	E
Matrix metalloproteinase 17	MMP17	E
Matrix metalloproteinase 18	MMP18	E
Matrix metalloproteinase 19	MMP19	E
Matrix metalloproteinase 2	· · · · · · · · · · · · · · · · · · ·	E
	MMP2	E
Matrix metalloproteinase 3	MMP3, STMY1	E
Matrix metalloproteinase 4	MMP4	Ε
Matrix metalloproteinase 5	MMP5	Ε
Matrix metalloproteinase 6	MMP6	E
Matrix metalloproteinase 7	MMP7	Ε
Matrix metalloproteinase 8	MMP8	. E
Matrix metalloproteinase 9	MMP9	Ε
MEK kinase, MEKK		. E
Melanocortin 1 receptor	MC1R	Т
Melanocortin 2 receptor	MC2R	T
Melanocortin 4 receptor	MC4R	Т
Mesoderm-specific transcript	MEST	G
Methylguanine-DNA methyltransferase	MGMT	Ε
Methylmalonyi-CoA mutase	MUT	Ε
Mevalonate kinase	MVK	E
MHC Class I: A		1
MHC Class I: B		1
MHC Class I: C		1
MHC Class I: LMP-2, LMP-7		1
MHC Class i: Tap1	ABCR, TAP1	1
MHC Class II: DP	HLA-DPB1	i
MHC Class II: DQ		i
MHC Class II: DR		i
MHC Class II: Tap2	TAP2, PSF2	i
MHC Class II:Complementation group A	MHC2TA	. i
MHC Class II:Complementation group B	rfxank	i
MHC Class II:Complementation group C	RFX5	1
MHC Class II:Complementation group D	RFXAP	l I
Microphthalmia-associated transcription	MITF	G
factor	1411 1 1	G
Midline 1	MID1	_
Mitochondrial trifunctional protein, alpha	HADHA	G
subunit	ווסטווא	Ε
Mitochondrial trifunctional protein, beta	HVUND .	_
subunit	HADHB	E
Moesin, MSN		_
INIOESIII, INIOIA		S

Molybdenum cofactor synthesis 1 Molybdenum cofactor synthesis 2 Monoamine oxidase A Monoamine oxidase B Monocyte chemoattractant protein 1 Mucolipidoses Mulibrey nanism Muscarinic receptor, M1	MOCS1 MOCS2 MAOA MAOB MCP1 GNPTA MUL CHRM1 CHRM2	EEEIETN
Muscarinic receptor, M2 Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N N
Muscarinic receptor, M5	CHRM5	. N
Muscle phosphorylase	PYGM	. N
Mutated in colorectal cancers, MCC	MCC	G
MutS homolog 3	MSH3	G
Myeloperoxidase	MPO	J
Myocilin	MYOC	Ϋ́ Τ
Myogenic factor 3	MYF3	Ġ
Myogenic factor 4	MYF4	G
Myogenic factor 5	MYF5	Ğ
Myoglobin		Ť
Myomesin 1	MYOM1	S
Myomesin 2	MYOM2	S
Myopia 1	MYP1	T
Myopia 2	MYP2	T .
Myosin 15	MYO15	S
Myosin 5A	MYO5A	S _. S
Myosin 6	MYO6	S
Myosin 7A	MYO7A	S
Myosin, cardiac	MYH7	S
Myosin, light chain 2	MYL2	S
Myosin, light chain 3	MYL3	S
Myotubularin	MTM1	S
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3	. <u>G</u>
Na+/H+ exchanger 1	NHE1	· • • • <u>T</u>
Na+/H+ exchanger 2	NHE2	T
Na+/H+ exchanger 3	NHE3	T.
Na+/H+ exchanger 4	NHE4	Ţ
Na+/H+ exchanger 5	NHE5 GALNS	Ţ
N-acetylgalactosamine-6-sulfate sulfatase N-acetylglucosamine-6-sulfatase	GNS	E E
N-acetylglucosaminidase, alpha	NAGLU	E
NADH dehydrogenase	NAGEO	E
NADH-cytochrome b5 reductase	DIA1	E
NADPH-dependent cytochrome P450	POR	E
147.D. 17 dopondont dytodnionio 1 400	1 011	_

	•	
reductase		
NB6		1
Nebulin	NEB	S
Nephrosis 1	NPHS1	T
Neural retina-specific gene	NRL	G
Neuraminidase sialidase	NEU	Т
Neuregulin	HGL	G
Neurexin		Ν
Neuroendocrine convertase 1	NEC1, PCSK1	Ε
Neurokinin A	NKNA	Ν
Neurokinin B	NKNB	\sim N
Neuropeptide Y	NPY	Ν
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Neurotensin	NTS	N
Neurotensin receptor	NTSR1	Ν
Nibrin	NBS1	G
Noggin	NOG	G
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL	1
Nuclear factor kappa beta	NFKB	1
Nuclear factor of activated T cells (NFAT)	NFATC	G
complex, cytosolic	•	
Nuclear factor of activated T cells (NFAT)	NFATP	G
complex, preexisting component		
Ocular albinism 1	OA1	S
Oculocutaneous albinism II	OCA2	S
Oncogene ERG (early reponse gene)	•	Ğ
Oncogene fos	FOS	G
Oncogene GLI1	GLI	G
Oncogene GLI2	GLI2	G
Oncogene GLI3	GLI3	Ğ
Oncogene sis	PDGFB	Ğ
Oncogene src		Ğ
Opioid receptor, delta	OPRD1	Ň
Opioid receptor, kappa	OPRK1	N
Opioid receptor, mu	OPRM1	N
Ornithine delta-aminotransferase	OAT	E
Osteocalcin		S
Osteonectin	ON	Ğ
Osteopontin	OPN	Ğ
Osteoprotegerin	OPG	Ğ
Oxytocin	OXT	N
Oxytocin receptor	OXTR	N
p21-activated kinase 3	PAK3	G
Paired box homeotic gene 1	PAX1	G
Paired box homeotic gene 2	PAX2	G
Paired box homeotic gene 3	PAX3	G
gono o	1 /7/10	G

Paired box homeotic gene 6	PAX6	G
Paired box homeotic gene 7	PAX7	Ğ
Paired box homeotic gene 8	PAX8	Ğ
Paired-like homeodomain transcription factor		Ğ
2		٠
Paired-like homeodomain transcription factor	PITX3	G
3	11170	G
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	G
Parathyroid hormone-like hormone	PTHLH	
Patched (Drosophila) homolog, PTCH	PTCH	G G
Peanut-like 1	PNUTL1	i
Peripherin, PRPH	THOTE	S
Peroxisomal membrane protein 1	PXMP1	S
Peroxisomal membrane protein 3	PXMP3	T
Peroxisome biogenesis factor 1	PEX1	Ť
Peroxisome biogenesis factor 19	PEX19	Ť
Peroxisome biogenesis factor 6	PEX6	Ť
Peroxisome biogenesis factor 7	PEX7	†
Peroxisome receptor 1	PXR1	Ť
Phenylethanolamine N-methyltransferase,	PNMT	E
PNMT	INIVII	
Phosphate regulating gene with homologies	PHEX	G
to endopeptidases on the X chromosome	, i.e.	Ų
Phosphodiesterase 1 / nucleotide	PDNP1	G
pyrophosphatase 1	. 2	0
Phosphodiesterase 1 / nucleotide	PDNP2	G
pyrophosphatase 2	. 5.11 2	•
Phosphodiesterase 1 / nucleotide	PDNP3	G
pyrophosphatase 3	. 5.41 0	0
	PFKM	E
Phosphoglucose isomerase	GPI	Ē
Phosphoglycerate kinase 1	PGK1	E
Phosphoglycerate mutase 2	PGAM2	E
Phospholipase A2, group 10	PLA2G10	ī
Phospholipase A2, group 1B	PLA2G1B	i
Phospholipase A2, group 2A	PLA2G2A	i
Phospholipase A2, group 2B	PLA2G2B	i
Phospholipase A2, group 4A	PLA2G4A	i
Phospholipase A2, group 4C	PLA2G4C	i
Phospholipase A2, group 5	PLA2G5	i
Phospholipase A2, group 6	PLA2G6	i
Phosphomannomutase 2	PMM2	Ġ
Phosphoribosyl pyrophosphate synthetase	PRPS1	E
Phosphorylase kinase, alpha 1 (muscle)	PHKA1	E
Phosphorylase kinase, beta	PHKB	E
Phosphorylase kinase, delta	· · · · · · · · · · · · · · · · · · ·	E

Phosphorylase kinase, gamma 2 Phytanoyl-CoA hydroxylase Pineolytic beta-receptors Plakophilin 1 Plasminogen Platelet derived growth factor Platelet derived growth factor receptor Plectin 1 Potassium inwardly-rectifying channel J1 Potassium voltage-gated channel E1 Potassium voltage-gated channel Q1 Potassium voltage-gated channel Q2 Potassium voltage-gated channel Q3 POU domain, class 3, transcription factor 4 POU domain, class 4, transcription factor 3 Prion protein Procollagen N-protease Prodynorphin Profibrinolysin Progesterone receptor (RU486 binding receptor)	PHKG2 PHYH PKP1 PLG PDGF PDGFR PLEC1 KCNJ1 KCNE1 KCNQ1 KCNQ2 KCNQ3 POU3F4 POU4F3 PRNP PGR	Ш О Ш Т Ш О О Т Z Z Z Z Z G G Z E E Z G G
Prolactin receptor	PRLR	G
Prolactin releasing hormone	PRH	G
Proliferin	PLF	G
Proopiomelanocortin	POMC	Ν
Properdin P factor, complement	PFC, PFD	1
Prophet of Pit1	PROP1	G
Propionyl-CoA carboxylase, alpha	PCCA	Ε
Prosaposin	PSAP	Ν
Prostacyclin synthase		ı
Prostaglandin 15-OH dehydrogenase Prostaglandin D - DP receptor Prostaglandin E1 receptor Prostaglandin E2 receptor Prostaglandin E3 receptor Prostaglandin F - FP receptor	HGPD; PGDH	1
		1
Prostaglandin F2 alpha receptor Prostaglandin I2 receptor	•	 -
•		Ţ
Prostaglandin IP receptor		1
Prostaglandin isomerase Protease nexin 2	DNO	G
	PN2 PPGB	E
Protective protein for beta-galactosidase Protein C	PROC	E
Protein C	FRUC	1
	NP	<u></u>
Purine nucleoside phosphorylase Purinergic receptor P1A1	INF	E
•		N
Purinergic receptor P1A2		Ν

•		•
Purinergic receptor P1A3	•	N
Purinergic receptor P2X, 1	P2RX1	N
Purinergic receptor P2X, 2	P2RX2	N
Purinergic receptor P2X, 3	P2RX3	N
Purinergic receptor P2X, 4	P2RX4	N
Purinergic receptor P2X, 5	P2RX5	N
Purinergic receptor P2X, 6	P2RX6	N
Purinergic receptor P2X, 7	P2RX7	N
Purinergic receptor P2Y, 1	P2RY1	N
Purinergic receptor P2Y, 11	P2RY11	N
Purinergic receptor P2Y, 2	P2RY2	N
Pyrroline-5-carboxylate synthetase	PYCS	
Pyruvate kinase	PKLR	E
Rabphilin	I KEK	
Radixin	RDX	N S
RAS-associated protein, RAB3A	RAB3A	
Rathke pouch homeobox, RPX	RPX	N
Receptor tyrosine kinase (RTK), Nsk2	NSK2	G
Retinal pigment epithelium specific protein	RPE65	G
(65kD)	NFE03	S
Retinitis pigmentosa gene 1	RP1	
Retinitis pigmentosa gene 2	RP2	S
Retinitis pigmentosa gene 2 Retinitis pigmentosa gene 3	RP3	S
, •	RP6	S
Retinitis pigmentosa gene 6		S
Retinitis pigmentosa gene 7 Retinoblastoma 1	RP7, RDS RB1	S
	RARA	G
Retinoic acid receptor, alpha		.G
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoid X receptor, alpha	RXRA	G
Retinoid X receptor, beta	RXRB	G
Retinoid X receptor, gamma	RXRG	G
Retinol binding protein 4	RBP4	T
Rhodopsin	RHO	S
RIGUI	RIGUI	G
Rim	DOM4	N
Rod outer segment membrane protein 1	ROM1	S
Ryanodine receptor 1, skeletal	RYR1	·G.
Serotonin N-acetyltransferase	SNAT	Ε
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	Ν
Serotonin receptor, 5HT2A	HTR2A	Ν
Serotonin receptor, 5HT2B	HTR2B	Ν
Serotonin receptor, 5HT2C	HTR2C	Ν

Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sex hormone binding globulin, SHBG	111137	
	202	T
Sialoprotein, bone	BSP	G
Signal transducer and activator of	STAT1	G
transcription 1		
Signaling lymphocyte activation molecule	SLAM	
Sine oculis homeobox, drosophila, homolog 1	SIX1	G
Sine oculis homeobox, drosophila, homolog 2	SIX2	G
Sine oculis homeobox, drosophila, homolog 5	SIX5	G
Sjoegren (Sjogren) syndrome antigen A1	SSA1	Ī
Slug protein		Ġ
Small nuclear ribonucleoprotein polypeptide	SNRPN	S
N	ONITY IV	3
Smoothelin	SMTN	_
		G
Smoothened (Drosophila) homolog	SMOH	G
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1,	SCNN1G	N
gamma	·	
Sodium channel, voltage gated, type IV,	SCN4A	Ν
alpha polypeptide		
Sodium channel, voltage gated, type V, alpha	SCN5A	N
polypeptide		•
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide	33.1.5	1
Solute carrier family 1 (glutamate	SLC1A1	Т
	SECIAI	ı
transporter), member 1	CL C4A0	_
Solute carrier family 1 (glutamate	SLC1A2	T
transporter), member 2		
Solute carrier family 12, member 1	SLC12A1	Т
Solute carrier family 12, member 2	SLC12A2	Т
Solute carrier family 12, member 3	SLC12A3	T
Solute carrier family 16 (monocarboxylate	SLC16A1	Т
transporter), member 1	and the second second	
Solute carrier family 16 (monocarboxylate	SLC16A7	Τ.
transporter), member 7		•
Solute carrier family 17, member 1	SLC17A1	Т
Solute carrier family 17, member 2	SLC17A2	Ť
Solute carrier family 19 (folate transporter),	SLC19A1	T
· · · · · · · · · · · · · · · · · · ·	SECIPAT	1
member 1	01 004 40	_
Solute carrier family 21, member 2	SLC21A2	T
Solute carrier family 21, member 3	SLC21A3	T
Solute carrier family 25, member 12	SLC25A12	Т
Solute carrier family 6 (GAMMA-	SLC6A1	T

AMINOBUTYRIC ACID transporter), member 1		
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	T
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	Т
Solute carrier family 6, member 10	SLC6A10	Т
Solute carrier family 6, member 8	SLC6A8	T
Solute carrier family 7(amino acid	SLC7A1	Т
transporter), member 1		
Solute carrier family 7(amino acid	SLC7A2	. T
transporter), member 2		
Solute carrier family 7(amino acid	SLC7A7	Т
transporter), member 7	0.0044	_
Solute carrier family 8 (sodium/calcium	SLC8A1	T
exchanger), member 1	CCT	N.
Somatostatin	SST	N
Somatostatin receptor, SSTR1	SSTR1 SSTR2	. N G
Somatostatin receptor, SSTR2	SSTR3	N
Somatostatin receptor, SSTR3 Somatostatin receptor, SSTR4	SSTR4	N
Somatostatin receptor, SSTR5	SSTR5	N
Sonic hedgehog, SHH	SHH	G
Sorbitol dehydrogenase	SORD	Ē
Sorcin	SRI	T
Spectrin alpha	SPTA1	S
Spectrin beta	SPTB	S
Sperm adhesion molecule	SPAM1	G
Sperm protamine P1	PRM1	G
Sperm protamine P2	PRM2	G
Sphingomyelinase	SMPD1	Ε
Split hand/foot malformation gene	DSS1	G
SRY-box 10	SOX10	G
SRY-box 11	SOX11	G
SRY-box 3	SOX3	G
SRY-box 4	SOX4	G
SRY-box 9	SOX9	G
Steroid 5 alpha reductase 1	SRD5A1	E-
Steroid 5 alpha reductase 2	SRD5A2	E
Steroid sulphatase	STS	N
Substance P	SDH1	E
Succinate dehydrogenase 1	SDH2	Ē
Succinate dehydrogenase 2	SGSH	G
Sulfamidase	SOD1	E
Superoxide dismutase 1 Superoxide dismutase 3	SOD3	Ē
Survival of motor neuron 1, telomeric	SMN1	Ŧ
Synapsin 1a & 1b	SYN1	N
Cynapolit ia a ib		

Synapsin 2a & 2b	SYN2	N
Synaptic vesicle protein 2	SV2	N
Synaptobrevin 1	SYB1	N
Synaptobrevin 2	SYB2	N
Synaptogyrin	,	N
Synaptophysin	SYP	N
Synaptosomal-associated protein, 25KD	SNAP25	
Synaptotagmin 1	SYT1	N
Synaptotagmin 2	SYT2	N
Synovial sarcoma gene 1	SSX1	N
Synovial sarcoma gene 2	SSX2	G
Syntaxin 1	STX1	G
Tachykinin receptor, NK1R	TACR1	N
Tachykinin receptor, NK2R	TACR2	N
Tachykinin receptor, NK3R	TACR3	N
Talin, TLN	TACKS	N
T-BOX 1	TBX1	S
T-BOX 2		G
T-BOX 3	TBX2	G
T-BOX 4	TBX3	G
T-BOX 5	TBX4	G
T-BOX 6	TBX5	G
TEK, tyrosine kinase, endothelial	TBX6	G
	TEK	E
Telomerase protein component Tetranectin	TNIA	E
Thrombospondin	TNA	T
·	THBS1	G
Thromboxane A synthase 1 Thromboxane A2	TBXAS1	į
Thromboxane A2 receptor	TXA2	
Thymosin	TBXA2R	!
Thyrotropin releasing hormone	TDU	J
Thyrotropin releasing hormone Thyrotropin releasing hormone	TRH	N
Thyrotropin releasing hormone receptor	TRH	G
Tip-associated protein	TRHR	Ņ
	TAP	<u> </u>
Tissue non-specific alkaline phosphatase TNSAP	•	Ε
Titin	TTN	_
Tocopherol (alpha) transfer protein	TTN	S
Torticollis, keloids, cryptorchidism and renal	TTPA TKCR	. T.
dysplasia gene	INCR	G
Transforming growth factor, alpha	TOTA	_
Transforming growth factor, beta 2	TGFA	G
	TGFB2	G
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Transglutaminase 1	TGM1	G
Transglutaminase 2	TGM2	G
Transglutaminase 4	TGM4	G
Transthyretin	TTR	Τ

Treacle gene	TCOF1	G
Triosephosphate isomerase	TPI1	Ē
Tropomyosin 1 alpha	TPM1	s
Tropomyosin 3 (non-muscle)	TPM3	Š
Troponin C		S
Troponin I	TNNI3	S
Troponin T2, cardiac	TNNT2	S
Trypsinogen 1	TRY1	E
Trypsinogen 2	TRY2	E
Tubby-like protein 1	TULP1	G
Tuberous sclerosis 1	TSC1	G
Tuberous sclerosis 2	TSC2	G
Tumor susceptibility gene 101	TSG101	G
Tumour necrosis factor (TNF) receptor	TRAF1	G
associated factor 1	INALI	1
Tumour necrosis factor (TNF) receptor	TRAF2	
associated factor 2	INAFZ	ì
	TRAF3	
Tumour necrosis factor (TNF) receptor associated factor 3	TRAFS	ı
	TDAE4	
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	1
	TDATE	
Tumour necrosis factor (TNF) receptor	TRAF5	ı
associated factor 5	TDAEC	,
Tumour necrosis factor (TNF) receptor	TRAF6	ł
associated factor 6	TNEA	
Tumour necrosis factor alpha	TNFA	!
Tumour necrosis factor alpha receptor	TNFAR	ı
Tumour necrosis factor beta	TNFB	1
Tumour necrosis factor beta receptor	TNFBR	l -
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tumour protein p73	TP73	G
Tumour protein, translationally-controlled 1	TPT1	G
Tumour suppresssor gene DRA	DRA	l
Tyrosinase	TYR	E
Tyrosinase-related protein 1	TYRP1	E
Tyrosine aminotransferase	TAT	Ε
Ubiquitin activating enzyme, E1		E E E T
Ubiquitin protein ligase E3A	UBE3A	Ε
Uncoupling protein 3	UCP3	
Undulin 1	COL14A1	S
Uroporphyrinogen decarboxylase	UROD	Ε
Usher syndrome 2A	USH2A	S
Vacuolar proton pump, subunit 1	VPP1	Ν
Vacuolar proton pump, subunit 3	VPP3	Ν
Vascular endothelial growth factor	VEGF	G
Vasoactive intestinal polypeptide	VIP	Ν
Vasoactive intestinal polypeptide receptor	VIPR	Ν
• • • • • • • • • • • • • • • • • • • •		

Villin		s
Vinculin		S
Vitamin D receptor	VDR ·	G
Vitelliform macular dystrophy, atypical gene	VMD1	T
Von Hippel-Lindau gene	VHL	Ġ
Von Willebrand factor	VWF	T
Werner syndrome helicase	WRN	Ġ
Winged helix nude	WHN	G
Wingless family, wnt2	WNT2	G
Wingless family, wnt4	WNT4	G
Wingless family, wnt5	WNT5	Ğ
Wingless family, wnt7	WNT7	G
Wingless family, wnt8	WNT8	Ğ
Wiskott-Aldrich syndrome protein	WASP, THC	Ī
Wnt inhibitory factor, WIF-1	WIF1	Ġ
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	Ğ
Wolfram syndrome 1 gene	WFS1	S
Xeroderma pigmentosum, complementation	XPA	Ē
group A		
Xeroderma pigmentosum, complementation group B	XPB	E
Xeroderma pigmentosum, complementation	XPC	Ε
group C		_
Xeroderma pigmentosum, complementation group D		Ε
Xeroderma pigmentosum, complementation	•	_
group E		Ε
Xeroderma pigmentosum, complementation group F	XPF	E
Xeroderma pigmentosum, complementation group G	ERCC5	E
X-ray repair gene	XRCC9	G

In a fourteenth aspect.

METABOLIC AND ENDOCRINE FUNCTIONS, DISORDERS AND DISEASE PATENT APPLICATION

This invention relates to method of assessing the risk of developing the clinical or social consequences of a metabolic or endocrine disorder or disease and indicating appropriate therapeutic interventions.

Cellular physiology is regulated by a complex series of interactions between molecules, which are referred to collectively as metabolism (Stryer 1995). Metabolism concerns the two central processes of how cells:

- extract energy from their environment
- synthesise and process the molecules required to maintain their function.

The number of molecular interactions taking place within a given cell is enormous and the overall complexity appears daunting. However, decades of study have shown that whilst the overall number of molecular interactions is very great, the types of interactions which molecules experience is finite. There are four major classes of biological molecules; carbohydrates, nucleic acids, lipids and proteins.

The core processes of metabolism can be condensed into a series of statements concerning the overall strategy used (Stryer 1995):

- ATP is the universal currency of energy;
- ATP is generated by the oxidation of fuel molecules such as glucose, fatty acids and amino acids.
- NADPH is the major electron donor in reductive biosyntheses,
- Biomolecules are constructed from a small set of building blocks,
- Biosynthetic and degradative pathways are almost always distinct.

The orchestration and co-ordination of this strategy for life is controlled largely by the allosteric interactions and reversible covalent modification of enzymes, by altered expression patterns and levels of key enzymes and by the compartmentation of different patterns of enzyme activity within the cell.

In human physiology a further dimension of complexity is added by the fact that different organs will have different metabolic roles and that a further system – the endocrine system- has evolved in order to integrate metabolism across the whole body.

The endocrine system is a diverse group of specialised tissues —glands- that secrete substances called hormones directly into the blood. The blood transports hormones to other organs or organelles where they interact with specific receptor sites and thus signal changes in cellular activities (e.g. glucocorticoids act to regulate immune system activities such as leucocyte movement or antigen processing). Hormonal secretion is variable and is controlled or prompted by the physiological demands of the body.

Principal endocrine glands include the following;

Brain

Pituitary

Pineal

Thyroid

Parathyroid

Adrenal

Pancreas

Ovary

Testes

Gastrointestinal Tract

Kidney

Thymus

Placenta

Each of these tissues manufacture and release hormones. Hormones can be classified according to their mode of targeting their sites of action;

Autocrine – acting on the same cells that manufacture them (e.g. IGF-1).

Paracrine – acting on neighbouring or distant cells separated by the extracellular space (e.g. insulin).

Endocrine – acting on cells or organs at distant sites and travelling in the blood stream or lymph (e.g. sex hormones)

Neuroendocrine - site of manufacture is within a neurone (e.g. GnRH).

Neural – synthesised in a neurone and released to act on an adjacent neurone (i.e. neurotransmitters such as acetylcholine).

Pheromonal – release of volatile hormones into the atmosphere where they can be detected by another individual.

Whatever the mechanism of release and travel to the target tissue, hormones act through specific receptors to generate selectivity of response in the target tissue. Charged molecules such as peptides generally bind to cell surface receptors and affect cell function by triggering secondary messenger systems (e.g. G proteins, tyrosine kinases). Uncharged molecules such as steroid hormones diffuse into cells and bind to receptor proteins which can be in the cytoplasm or the nucleus (e.g heat shock protein –HSP90). The hormone-receptor complex can then be transported into the nucleus In order to bind to DNA and affect rates of protein transcription and the metabolic activity of cells.

The interaction between metabolism and endocrine regulation is a key event for the maintenance of homeostasis – the ability to main a stable body environment despite changes in the external environment. Integration of the body systems is achieved through a series of regulatory systems which utilise negative and positive feedback mechanisms (systems limit each others' activity within certain parameters) in order to maintain homeostasis.

The critical role of proteins (e.g. as enzymes or transporters in metabolism or hormones in the endocrine system) and the presence of multiple regulatory loops linking the various metabolic and endocrine activities ensures that variability in the functionality of particular proteins can lead to profound clinical consequences.

Genetic variation in genes coding for proteins involved in metabolic or endocrine function can lead to the production of defective enzymes or altered receptor binding affinities. In cystinuria there is a defective transport of cystine, lysine, ornithine, arginine and homoarginine across the epithelium of the small intestine due to a defective protein. In Tay-Sachs disease there is defective processing of hexosaminidase-A leading to gangliosidosis.

The range of clinical manifestations of metabolic and endocrine damage dysfunction or disease is very wide (Weatheral, Leadingham and Warrell 1996) and spans failure to thrive in infancy to infertility problems to dementia.

The range of potential therapeutic interventions is also wide, from simple dietary controls (e.g. phenylketonuria) to liver transplantation (e.g galactosaemia) and gene therapy (e.g. cystic fibrosis).

Metabolism and endocrine status has important implications for therapeutic interventions and particularly drug usage. Body height and weight is one of the critical parameters in calculating drug dosage. Malnourished patients can have aberrant electrolyte balances conferring significant cadiovascular risks with certain drugs such as cholinergic or adrenergic agonists and calcium channel blockers. Obesity also affects the distribution of lipophilic drugs through the body and the metabolism of many drugs will be affected by the presence of food in the gastrointestinal tract (Brody, Larner, Minneman 1998). Meals can also alter the physiology of the body by inducing vasoconstriction or enhanced metabolism in various organs.

Alterations in endocrine status caused by either changes in physiological state, injury or disease (e.g pregnancy, diabetes, pituitary tumors) are known to have a profound affect on health and response to disease and therapeutic interventions (Weatherall, Leadingham and Warrell 1996, Brody, Larner and Minneman 1998).

The physiology and control of the body's metabolic and endocrine systems is extremely complex and involves the synergistic or inhibitory interaction between multiple regulatory pathways and molecular cascades. Variation in the functionality of the proteins involved in these processes will, inevitably, cause or have an impact on the functioning of these systems or an individuals attempts to minimise damage and restore function following dysfunction, damage or disease in these systems. A number of constitutional factors are known to impact on the individuals ability to deal with and recover from infection and injury including genetic history, age, sex, nutritional status, pre-existing disease or injury and drug treatments. Genetic variation within individuals is also a key factor although the extent and nature of the genes involved and their precise impact on prognosis, complications, efficacy of therapeutic intervention and eventual recovery of function is largely unknown.

The individual variability in response to damage, dysfunction or diseae affecting the metabolic or endocrine systems and the associated variation in symptomatology, response to therapy and adverse events resulting from therapeutic interventions lies at

the heart of the difficulties experienced in the healthcare and social management of metabolic and endocrine damage, dysfunction or disease.

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

METABOLIC & ENDOCRINE GENE LIST	HUGO gene	Protein
470	symbol	function
17beta hydroxysteroid dehydrogenase 1	HSD17B1	E
17beta hydroxysteroid dehydrogenase 3	HSD17B3	E
17beta hydroxysteroid dehydrogenase 4	HSD17B4	E
17beta hydroxysteroid oxidoreductase		E
17-ketosteroid reductase		N
18-hydroxysteroid oxidoreductase		E
2,3-bisphosphoglycerate mutase	BPGM	E
2,4-dienoyl CoA reductase	DECR	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	E
3-oxoacid CoA transferase	OXCT	E
5-adenosyl homocysteine hydrolase		E
6-phosphofructo-2-kinase	PFKFB1	Ε
6-pyruvoyltetrahydropterin synthase	PTS	E
Acetoacetyl 1-CoA-thiolase	ACAT1	E
Acetyl CoA acyltransferase	ACAA	E
Acetyl CoA carboxylase	ACC	E
Acetyl CoA carboxylase alpha	ACACA	E
Acetylcholinesterase	ACHE	E
Acid phosphatase 2, lysosomal-	ACP2	E
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Activin		G
Activin A receptor, type 2B	ACVR2B	G
Activin A receptor, type 2-like kinase 1	ACVRL1	G
Acyl CoA dehydrogenase, long chain	ACADL	
Acyl CoA dehydrogenase, medium chain	ACADM	E E
Acyl CoA dehydrogenase, short chain	ACADS	Ē
Acyl CoA dehydrogenase, very long chain	ACADVL	Ē

		•
Acyl CoA synthetase, long chain, 1	LACS1	Æ
Acyl CoA synthetase, long chain, 2	LACS2	E
Acyl CoA synthetase, long chain, 4	ACS4	E
Acyl malonyl condensing enzyme	,,,,,,	Ē
Adenomatous polyposis coli tumour	APC	G
supressor gene	, · ·	G
Adenosine deaminase	ADA	_
Adenosine monophosphate deaminase	AMPD	E E
Adenosine receptor A1	ADORA1	
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	N
Adenyl cyclase	ABOINS	N
Adenylate cyclase 1	ADCY1	N
Adenylate cyclase 1 Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	E
Adenylate cyclase 3 Adenylate cyclase 4	ADCY4	
Adenylate cyclase 5	ADCY5	E E E
Adenylate cyclase 6	ADCY6	
Adenylate cyclase 7	ADCY7	
Adenylate cyclase 8	ADCY8	E
Adenylate cyclase 9	ADCY9	E
Adenylate transferase	ADC19	E
ADP-ribosyltransferase	ADPRT	E
Adrenergic receptor, alpha1	ADRA1	E
Adrenergic receptor, alpha?	ADRA1 ADRA2	N
Adrenergic receptor, aiphaz Adrenergic receptor, beta1	ADRB1	N N
Adrenergic receptor, beta1	ADRB2	
Adrenergic receptor, beta2 Adrenergic receptor, beta3	ADRB3	N N
Adrenoleukodystrophy gene	ALD	E
Albumin, ALB	ALB	T
Alcohol dehydrogenase 1	ADH1	
Alcohol dehydrogenase 2	ADH2	E
Alcohol dehydrogenase 3	ADH3	E E
	ADH4	_
Alcohol dehydrogenase 4 Alcohol dehydrogenase 5	ADH5	E
Alcohol dehydrogenase 6	ADH6	E
Alcohol dehydrogenase 7	ADUZ	E E.,.
Aldehyde dehydrogenase 1	ALDH1	
Aldehyde dehydrogenase 10	ALDH10	E
Aldehyde dehydrogenase 2	ALDH10 ALDH2	E E E E
Aldehyde dehydrogenase 5	ALDH2 ALDH5	
Aldehyde dehydrogenase 6	=	=
• •	ALDH6	<u> </u>
Aldehyde dehydrogenase 7 Aldolase A	ALDH7	E
Aldolase B	ALDOA	E
	ALDOB	E
Aldotarana recentar	ALDOC	E
Aldosterone receptor	MLR	G

	Aller Consultation and the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the second section of the section of the second section of the second section of the section of the second section of the section o	41 -	
	Alkaline phosphatase, liver/bone/kidney	ALPL	T
	Alkylglycerone phosphate synthase	AGPS	E
	Alpha 1 acid glycoprotein	AAG; AGP	Т
	alpha1-antitrypsin	Pl	Ε
	alpha-actinin 2	ACTN2	G
	alpha-actinin 3	ACTN3	G
	alpha-amino adipic semialdehyde synthase		Ε
	alpha-glucosidase, neutral AB	GANAB	Ε
	alpha-glucosidase, neutral C	GANC	
	alpha-ketoglutarate dehydrogenase		E
	Aminomethyltransferase	AMT	E ·
	Aminopeptidase P	XPNPEP2	E
	Amphiregulin	AREG	G
	Amylo-1,6-glucosidase	AGL	Ε
	Androgen receptor	AR	G
	Angiopoietin 1	ANGPT1	G
	Angiopoietin 2	ANGPT2	Ğ
	Angiotensin converting enzyme	ACE, DCP1	Ē
	Angiotensin receptor 1	AGTR1	T
	Angiotensin receptor 2	AGTR2	Ť
	Angiotensinogen	AGT	Ė
	Anti-Mullerian hormone	AMH	Ğ
	Anti-Mullerian hormone type 2 receptor	AMHR2	Ğ
	Apolipoprotein A I	APOA1	T
	Apolipoprotein A II	APOA2	Ť
	Apolipoprotein B	APOB	Ť
	Apolipoprotein C1	APOC1	Ť
	Apolipoprotein C2	APOC2	Ť
	Apolipoprotein C3	APOC3	Ť
	Apolipoprotein D	APOD	Ť
	Apolipoprotein E	APOE	Ť
	Apolipoprotein H	APOH	Ť
	Aquaporin 1	AQP1	Ť
	Aquaporin 2	AQP2	T
	Arginine vasopressin	AVP	N
	Arginine vasopressin receptor 1A	AVPR1A	N
	Arginine vasopressin receptor 1B	AVPR1B	N
	Arginine vasopressin receptor 2	AVPR2	N
	Asparagine synthetase	AS /	E
	Aspartate transcarbamoylase	AS	E
	Ataxia telangiectasia complementation group	ATD ATDC	G
	D	AID, AIDC	G
	Ataxia telangiectasia gene, AT	ATM	^
		AIM	G
	ATP cobalamin adenoxyltransferase	AND	E
	Atrial natriuratio poptide	ANP	G
	Atrial natriuratic peptide receptor A	NPR1	G
	Atrial natriuretic peptide receptor B	NPR2	G
:	Atrial natriuretic peptide receptor C	NPR3	G

Attractin	•	ı
Autoimmune regulator, AIRE	AIRE	i
beta-endorphin receptor		N
beta-galactosidase	GLB1	Ε
beta-ketoacyl reductase		Ε
Bile acid coenzyme A: amino acid N-	BAAT	Ε
acyltransferase		
Bile sait export pump	BSEP, PFIC2	T
Bile salt-stimulated lipase	CEL	Ε
Bilirubin UDP-glucuronosyltransferase		Ε
Bloom syndrome protein	BLM	G
Bradykinin receptor B1		ļ
Bradykinin receptor B2		I
Branched chain aminotransferase 1, cytosolic	BCAT1	Ε
Branched chain aminotransferase 2,	BCAT2	Ε
mitochondrial		
Branched chain keto acid dehydrogenase E1,	BCKDHA	Ε
alpha polypeptide		
Branched chain keto acid dehydrogenase E1,	BCKDHB	E
beta polypeptide		
Butyrylcholinesterase	BCHE	Ε
C17-20 desmolase		Ε
C3 convertase		Ε
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	ı
Calcineurin A2	CALNA2	1
Calcineurin A3	CALNA3	1
Calcineurin B		I
Calcitonin receptor /Calcitonin gene-related	CALCR	N
peptide receptor		
Calcitonin/Calcitonin gene-related peptide	CALCA	N
alpha		
Calcium channel, voltage-dependent, alpha	CACNA1F	N
1F subunit		
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	N
1C		
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)		
	CACNA2	N
2/delta	- 4 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
	CACNB1	N
	CACNB3	N
Calcium channel, voltage-dependent, L type,	CACNA1S	Ν

alpha 1S subunit		
Calcium channel, voltage-dependent,	CACNG2	N
Neuronal, Gamma	0/10/102	IN
Calcium channel, voltage-dependent, P/Q	CACNA1A	N
type, alpha 1A subunit		14
Calcium channel, voltage-dependent, T-type	·	Ν
Calcium sensing receptor	CASR	T
Calmodulin 1	CALM1	Ġ
Calmodulin 2	CALM2	Ğ
Calmodulin 3	CALM3	Ğ
Calmodulin-dependant protein kinase II	CAMK2A	Ğ
Calnexin	CANX	Ğ
Calpain	CAPN, CAPN3	Ē
Calretinin	CALB2	N
Canalicular multispecific organic anion	CMOAT	T
transporter		•
Cannabinoid receptor	CNR1	Ν
Carbonic anhydrase 3	CA3	E
Carbonic anhydrase 4	CA4	Ε
Carbonic anhydrase, alpha	CA1	
Carbonic anhydrase, beta	CA2	Ε
Carboxylesterase 1	CES1	E E
Cardiac-specific homeobox, CSX	CSX	G
Carnitine acetyltransferase	CRAT	Ε
Carnitine acylcarnitine translocase	CACT	Ε
Carnitine palmitoyltransferase I	CPT1A	Ε
Carnitine palmitoyitransferase II	CPT2	E E
Carnitine transporter protein	CDSP, SCD	T
Carnosinase		Ν
Cartilage-hair hypoplasia gene	CHH	N
Catechol-O-methyltransferase	COMT	Ε
Cell adhesion molecule, intercellular, ICAM	ICAM1	G
Cell adhesion molecule, leukocyte-	LECAM1	G
endothelial, LECAM (CD62)		
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	PECAM1	G
PECAM		
Cell adhesion molecule, vascular, VCAM	VCAM1	G
c-erbB2	ERBB2	G
c-erbB3	ERBB3	G
c-erbB4	ERBB4	G
Chitotriosidase	chit	Ε
Cholecystokinin	CCK	Ν
Cholecystokinin B receptor	CCKBR	Ν
Cholesterol ester hydroxylase		Ε

Cholesterol ester transfer protein Choline acetyltransferase Chromogranin A Chymase	CETP CHAT CHGA CHY1	T E G
Citrate synthase Clathrin Clusterin CoA transferase	CLU	E T G E
Collagen IV alpha 5 Collagen IV alpha 6 Complex III	COL4A5 COL4A6	SSE
Complex V Corticosteroid binding globulin Corticotrophin-releasing hormone Corticotrophin-releasing hormone receptor Cortisol receptor	MTATP6 CBG CRH CRHR1	E N T T
Cubilin Cyclic AMP-dependent protein kinase Cyclic nucleotide phosphodiesterase 1B Cyclic nucleotide phosphodiesterase 1B1 Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B	CUBN PKA PDE1B PDE1B1 PDE2A3 PDE3A PDE3B	TEEEEE
Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4C Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7	PDE4A PDE4C PDE5A PDE6A PDE6B PDE7	
Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	PDE8 PDE9A CDKN1C	E E G
Cyclin-dependent kinase inhibitor 2A (p16) Cyclooxygenase 1 Cyclooxygenase 2 CYP11A1	CDKN2A COX1 COX2 CYP11A1	G E E E
CYP11B1 CYP11B2 CYP17 CYP19	CYP11B1 CYP11B2 CYP17 CYP19	EEE
CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24	CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24	EEEE
CYP27 CYP27B1	CYP24 CYP27 PDDR	E

CYP2A1	CYP2A1	Ε
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	E
CYP2A6V2	CYP2A6V2	Ė
CYP2A7	CYP2A7	Ē
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	E
CYP2C19	CYP2C19	_
CYP2C8	CYP2C8	E
CYP2C9	CYP2C9	E
CYP2D6	CYP2D6	E
CYP2E1	CYP2E1	E
CYP2F1	CYP2F1	E
CYP2J2	CYP2J2	E
CYP3A3	CYP3A3	
CYP3A4	CYP3A4	Ε
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	E
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	Ε
CYP4F3	CYP4F3	E
CYP51	CYP51	E
CYP5A1	CYP5A1	
CYP7A	CYP7A	E
CYP8	CYP8	E
Cystathionase	CTH	E
Cystathione beta synthase	CBS	E
Cystic fibrosis transmembrane conductance	CFTR	N
regulator, CFTR	OI III	IN
Cystinosin	CTNS	Т
Cytidine dearninase	CDA	Ė
Cytidine-5-prime-triphosphate synthetase	CTPS ~	E
Cytochrome a		E
Cytochrome c		Ē
Cytochrome c oxidase, MTCO		Ē
Cytokine-suppressive antiinflammatory drug-	CSBP1	ī
binding protein 1	And the second of the second o	
Cytokine-suppressive antiinflammatory drug-	CSBP2	1
binding protein 2		•
DAX1 nuclear receptor	DAX1	1
D-beta-hydroxybutyrate dehydrogenase		Ė
Dehydratase		Ē
Delta 4-5 oxosteroid isomerase		E
Delta aminolevulinate synthase 1	ALAS1	E
Delta aminolevulinate synthase 2	ALAS2	E
Deoxycorticosterone (DOC) receptor	·	Ε
Deoxyuridine triphosphatase; dUTPase		E

DHEA sulfotransferase	STD	E
Dihydrodiol dehydrogenase 1	DDH1	E
Dihydrolipoamide branched chain	DBT	N
transacylase		
Dihydrolipoamide dehydrogenase	DLD	N
Dihydrolipoyl dehydrogenase 2	PDHA	E
Dihydrolipoyl transacetylase	PDHA	Ē
Dihydroorotase		E
Dihydropyramidinase	DPYS	Ē
Dihydroxyacetonephosphate acyltransferase	DHAPAT	Ē
Dihyropyrimidine dehydrogenase	DPYD	Ē
DNA glycosylases	5. 15	E
DNA helicases		E
DNA Ligase 1	LIG1	E
DNA methyltransferase	DNMT	E
DOPA decarboxylase	DDC	E
Dopamine beta hydroxylase	DBH	E
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	· N
Dopamine receptors D3	DRD3	N N
Dopamine receptors D4	DRD4	. N
Dopamine receptors D5	DRD5	N
Dynamin	DNM1	G
Electron-transfering-flavoprotein alpha	ETFA	T
Electron-transfering-flavoprotein beta	ETFB	Ť
Electron-transferring flavoprotein	ETFDH	É
dehydrogenase	21. 51.	-
Endometrial bleeding-associated factor	EBAF	G
Endothelin converting enzyme	ECE1	N
Endothelin receptor type A	EDNRA	N
Endothelin receptor type B	EDNRB	N
Enolase	ENO1	Ë
Enoyl CoA reductase	21101	E
Enterokinase	PRSS7, ENTK	Ē
Ephrin receptor tyrosine kinase A	EPHA	Ğ
Ephrin receptor tyrosine kinase B	EPHB	G
Epidermal growth factor	EGF	G
Epidermal growth factor receptor	EGFR	G
Erythropoietin	EPO)
Estrogen receptor	ESR	Ġ
Excision repair complementation group 1	ERCC1	E
protein	211001	
Factor 1 (No. one)	F1	1
FADH dehydrogenase		E
Fatty acid binding proteins FABP2	FABP2	T
Fc fragment of IgG, high affinity IA, receptor	FCGR1A	G
for		9
Fc fragment of IgG, low affinity IIa, receptor	FCGR2A	G
		_

for (CD32) Fc fragment of IgG, low affinity Illa, rece	ptor FCGR3A	G
for (CD16)	•	
Ferritin, H subunit		Т
Ferritin, L subunit	FTL	T
Fibrinogen alpha	FGA	
Fibrinogen beta	FGB	S S S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Flavin-containing monooxygenase 1	FMO1	E
Flavin-containing monooxygenase 2	FMO2	E
Flavin-containing monooxygenase 3	FMO3	E
Flavin-containing monooxygenase 4	FMO4	E
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Follistatin	. 62	G
Frataxin	FRDA	G
Fructose-1,6-diphosphatase	FBP1	E
Fumarase	FH	E
Fumarylacetoacetase	FAH	Ē
GABA receptor, alpha 1	GABRA1	N
GABA receptor, alpha 2	GABRA2	N
GABA receptor, alpha 3	GABRA3	N
GABA receptor, alpha 4	GABRA4	N N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	N
GABA receptor, beta 1	GABRB1	N
GABA receptor, beta 2	GABRB2	, N
GABA receptor, beta 3	GABRB3	N
GABA receptor, gamma 1	GABRG1	N
GABA receptor, gamma 2	GABRG2	N
GABA receptor, gamma 3	GABRG3	N
GABA transaminase	ABAT	E
Galactocerebrosidase	GALC	Ē
Galactokinase	GALK1	E
Galactose 1-phosphate uridyl-transferase	GALT	Ē
Galanin	GAL	N
Galanin receptor	GALNR1	N
Gamma-glutamyl carboxylase	GGCX	T
Gamma-glutamyltransferase 1	GGT1	Ť
Gamma-glutamyltransferase 2	GGT2	Ť
Gap junction protein beta 1	GJB1	Ť
Gap junction protein beta 3	GJB3	Ť
Gastric inhibitory polypeptide GIP	GIP	Ť
Gastric inhibitory polypeptide receptor, G		Ť
		•

	•			
	Gastric Intrinsic factor, GIF	GIF		E
	Gastric lipase, LIPF			T
	Gastrin	GAS		G
	Gastrin releasing peptide	GRP		Т
	Gastrin releasing peptide receptor	GRPR		Т
	Glucagon receptor	GCGR		G
	Glucagon synthase			Ť
	Glucagon-like peptide receptor 1	GLP1R		Ġ
	Glucocorticoid receptor	GRL		Ğ
	Glucokinase	GCK	•	E
	Glucosaminyl (N-acetyl) transferase 2, I-	GCNT2		E
	branching enzyme			_
	Glucose-6-phosphatase	G6PC		Е
	Glucose-6-phosphatase translocase	G6PT1		E
	Glucose-6-phosphate dehydrogenase	G6PD		E
	Glucosidase, acid beta	GBA		E
	Glutamate decarboxylase, GAD	GAD1		Ē
	Glutamate dehydrogenase	GLUD1		E
	Glutamine phosphoribosylpyrophosphate	OLOD I		E
	amidotransferase/PRPP amidotransferase			_
	Glutamine synthase		•	_
	Glutathione	GSH		E
	Glutathione peroxidase, GPX2	GPX2		T
	Glutathione reductase, GSR	GSR		E
	Glutathione S-transferase, GSTZ1	GSTZ1		E
	Glutathione synthetase	GSS		E
	Glyceraldehyde-3-phosphate dehydrogenase.			E
	SAPDH	, САРОП		Ε
	Glycerol kinase	GK		E
	Glycerophosphate dehydrogenase 2	GPD2		Ē
	Glycinamide ribonucleotide (GAR)	GART		Ē
	ransformylase	07 (17)		_
	Glycine dehydrogenase	GLDC		Ε
(Glycogen branching enzyme	GBE1		E
	Glycogen phosphorylase	PYGL		E
	Glycogen synthase 1 (muscle)	GLYS1	•	Ē
	Glycogen synthase 2 (liver)	GYS2		Ē
	Glycosyltransferases, ABO blood group	ABO	• • • •	Ē
	Sonadotropin releasing hormone	GNRH	•	Ğ
	Gonadotropin releasing hormone receptor	GNRHR		Ğ
	Growth arrest-specific homeobox	GAX		Ğ
	Growth hormone 1	GH1		Ğ
	Growth hormone 2 (placental)	GH2		G
	Growth hormone receptor	GHR		G
	Growth hormone releasing hormone (GHRH)	GHRH		G
	Growth hormone releasing hormone receptor	GHRHR		G
	GTP cylcohydrolase 1	GCH1		G
	GTPase-activating protein, GAP	RASA1		G
•				J

Guanidinoacetate N-methyltransferase	GAMT	E
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNAO1	N
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAI1	GNAI1	N
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNAI2	GNAI2	N
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNAI3	GNAI3	N
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	· N
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	N
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	N
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	N
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNAT1	N
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	N
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	N
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	N
Guanine nucleotide-binding protein, q polypeptide	GNAQ	N
Guanylate cyclase 2D, membrane (retinaspecific)	GUCY2D	E
Guanylate cyclase activator 1A (retina) Guanylate kinase	GUCA1A	E
Guanylin	GUCA2	Т
Guanylyl cyclase		E
Heat shock protein, HSP60		1
Heat shock protein, HSP70		1
Heat shock protein, HSP90		1
Heat shock protein, HSPA1		1
Heat shock protein, HSPA2		1
Hemopexin	HPX	, 1
Heparin binding epidermal growth factor	HBEGF	G
Hepatic lipase	LIPC	E
Hepatic nuclear factor-3-beta	HNF3B	Ε
Hepatic nuclear factor-4-alpha	HNF4A	E
Hexokinase 1	HK1	E
Hexokinase 2	HK2	E
Hexosaminidase A	HEXA,TSD	E
Hexosaminidase B Histamine receptors, H1	HEXB	E N

Histamine receptors, H2	•	Ν
Histamine receptors, H3		Ν
HMG-CoA lyase	HMGCL	E
HMG-CoA reductase	HMGCR	Ε
HMG-CoA synthase	HMGCS2	Ε
Holocarboxylase synthetase	HLCS	Ε
Holoprosencephaly 1	HPE1	G
Holoprosencephaly 2	HPE2	G
Holoprosencephaly 3	HPE3	G
Holoprosencephaly 4	HPE4	Ğ
Homeobox (HOX) gene A13	HOXA13	G
Hormone-sensitive lipase	HSL	E
HSSB, replication protein		E
Human chorionic gonadtrophin, hCG	CG	G
Human placental lactogen	CSH1	G
Hydroxyacyl glutathione hydrolase	HAGH	E
Hypoxanthine-guanine	HPRT	E
phosphoribosyltransferase, HGPRT	HERT .	_
Hypoxia inducible factor 1	HIF1A	_
Hypoxia inducible factor 2	111117	E E
Iduronate 2 sulphatase	IDS	
Immunoglobulin E (IgE) reponsiveness gene	IGER	E
· · · · · · · · · · · · · · · · · · ·		
Immunoglobulin E (IgE) serum concentration regulator gene	IGES	ı
•	ICHC2	
Immunoglobulin gamma (IgG) 2	IGHG2	1
Indian hedgehog, ihh	IHH	G
Inhibin, alpha	INHA	G
Inhibin, beta A	INHBA	G
Inhibin, beta B	INHBB	G
Inhibin, beta C	INHBC	G
Inosine monophosphate dehydrogenase, IMPDH		E
Inosine triphosphatase	ITPA	Ε
Inositol 1,4,5-triphosphate receptor 1	ITPR1	G
Inositol monophosphatase	IMPA1	N
Inositol polyphosphate 1-phosphatase	INPP1	N
Insulin	INS	G
Insulin receptor	INSR	G
Insulin receptor substrate-1	IRS1	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	
Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor		G
Integrin beta 1	IGF2R	G
•	ITGB1	G
Integrin beta 2	ITGB2	G
Interleukin(IL) 1 receptor	IL1R	!
Interleukin(IL) 1, alpha	IL1A	!
Interleukin(IL) 1, beta	IL1B	ł

Interior district A A A	11.40	
Interleukin(IL) 10	IL10	1
Interleukin(IL) 10 receptor	IL10R	1
Interleukin(IL) 11	IL11	1
Interleukin(IL) 11 receptor	IL11R	- 1
Interleukin(IL) 12	IL12	j
Interleukin(IL) 12 receptor, beta 1	IL12RB1	1
Interleukin(IL) 13	IL13	1
Interleukin(IL) 13 receptor	IL13R	1
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	
Interleukin(IL) 2 receptor, gamma	IL2RG	I
Interleukin(IL) 3	IL3	1
Interleukin(IL) 3 receptor	IL3R	l
Interleukin(IL) 4	IL4	
Interleukin(IL) 4 receptor	IL4R	1
Interleukin(IL) 5	IL5	1
Interleukin(IL) 5 receptor	IL5R	1
Interleukin(IL) 6	IL6	1
Interleukin(IL) 6 receptor	IL6R	1
Interleukin(IL) 7	IL7	· I
Interleukin(IL) 7 receptor	IL7R	1
Interleukin(IL) 8	IL8	1
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	i
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	ļ
lodothyronine-5'-deiodinase, type 1 and 2 IP3 kinase		E
	LADO	Ε
Islet amyloid polypeptide	IAPP	N
Isocitrate dehydrogenase	ייי	E
Isovaleric acid CoA dehydrogenase Janus kinase 1	IVD	E
Janus kinase 2	JAK1	G
Janus kinase 3	JAK2	G
	JAK3	G
Kallman syndrome gene 1 Ketohexokinase	KAL1	G
ketolase	KHK	E
Lactase	engligger in the register of the control of	E
Lactotransferrin	LTF	Ē
Laminin 5, alpha 3	LAMA3	T
Laminin 5, beta 3	LAMB3	G
Laminin receptor 1	LAMR1	G
Lecithin-cholesterol acyltransferase	LAMRT	G
Leptin	LEP	E
Leptin receptor	LEPR	G
Leukotriene C4 synthase	LTC4S	G
LH/choriogonadotropin (CG) receptor	LHCGR	E
Lipoamide dehydrogenase	OGDH	G
a.paa.maa aanyaraganasa	OGDIT	Ε

Lipoprotein lipase	LPL	ı
Lipoprotein, High Density	HDLDT1	Ť
Lipoprotein, Intermediate Density	•	Ť
Lipoprotein, Low Density 1		T
Lipoprotein, Low Density 2		Ť
Lipoprotein, Very Low Density	VLDLR	Ť
Lipoprotein-associated coagulation factor	LACI	i
Lipoxygenase -		Ė
Lipoxygenase 12 (platelets)	LOG12	Ī
Lipoxygenase 5 (leukocytes)	200.2	i
Luteinizing hormone, beta chain	LHB	Ġ
Lymphocyte-specific protein tyrosine kinase	LCK	ı
Lysosomal acid lipase	LIPA	Ė
MAD (mothers against decapentaplegic,	MADH2	G
Drosophila) homologue 2	WADIIZ	G
Malate dehydrogenase, mitochondrial	MDH2	_
Malonyl CoA decarboxylase	WIDITIZ	E
Malonyl CoA decarboxylase Malonyl CoA transferase		E
Maltase-glucoamylase		E
Mannosidase, alpha B lysosomal	MANB	E
Mannosyl (alpha-1,6-)-glycoprotein beta-1, 2-		Ţ
N-acetylglucosaminyltransferase	WGA12	1.
Marenostrin	MEFV	Т
Matrix Gla protein	MGP	Ġ
MEK kinase, MEKK	WGF	<u> </u>
Melanocortin 2 receptor	MC2R	E
Melanocortin 4 receptor	MC4R	÷
Menin	MEN1	Ġ
Methionine adenosyltransferase	MAT1A, MAT2A	E
Methionine synthase	MTR	E
Methionine synthase reductase	MTRR	
Methylguanine-DNA methyltransferase	MGMT	E
Methylmalonyl-CoA mutase	MUT	E
Mitochondrial trifunctional protein, alpha	HADHA	E
subunit	TIADITA	
Mitochondrial trifunctional protein, beta	HADHB	E
subunit	HADHB	=
Molybdenum cofactor synthesis 1	MOCS1	٠.:
· · · · · · · · · · · · · · · · · · ·	MOCS2	E
Molybdenum cofactor synthesis 2 Monoamine oxidase A	MAOA	E E
	MAOB	
Monoamine oxidase B	· -	E
Multidrug resistance associated protein	MRP	G
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Muscle phosphorylase	PYGM	Ε

Na+, K+ ATPase, alpha	ATP1A1		G
Na+, K+ ATPase, beta 1	ATP1B1		G
Na+, K+ ATPase, beta 2	ATP1B2		G
Na+, K+ ATPase, beta 3	ATP1B3		G
Na+/H+ exchanger 1	NHE1		Т
Na+/H+ exchanger 2	NHE2		T
Na+/H+ exchanger 3	NHE3		Ť
Na+/H+ exchanger 4	NHE4		Ť
Na+/H+ exchanger 5	NHE5		Ť
N-acetyltransferase 1	NAT1		Ė
N-acetyltransferase 2	NAT2		E
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS1		Ē
protein 1	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		-
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS4		Ε
protein 4			
NADH dehydrogenase (ubiquinone)	NDUFV1		Ε
flavoprotein 1			
NADH-cytochrome b5 reductase	DIA1		Е
NADPH-dependent cytochrome P450	POR		Ē
reductase			_
Nephronophthisis 1	NPHP1		Т
Nephrosis 1	NPHS1		T
Nerve growth factor	NGF		Ġ
Nerve growth factor receptor	NGFR		Ğ
Neuraminidase sialidase	NEU		T
Neuregulin	HGL		Ġ
Neuroendocrine convertase 1	NEC1, PCSK1		E
Neurofibromin 1	NF1		G
Neurofibromin 2	NF2		G
Neuropeptide Y	NPY		N
Neuropeptide Y receptor Y1	NPY1R		N
Neuropeptide Y receptor Y2	NPY2R		N
Neurotensin	NTS		N
Neurotensin receptor	NTSR1		N
Neurotrophin 3	NTF3 or NT3		G
Neutral endopeptidase	0 01 1110		E
Niemann-Pick disease protein	NPC1		T
Nitric oxide synthase 1, NOS1	NOS1		Ė
Nitric oxide synthase 2, NOS2	NOS2		E E
Nitric oxide synthase 3, NOS3	NOS3		E E
Notch ligand - jagged 1	JAG1, AGS		
Nucleoside diphosphate kinase-A	NDPKA		G
Oncogene ret	RET		E
Oncogene sis			3
Orexin	PDGFB		3
Orexin 1 receptor	OX OX1B		3
Orexin 2 receptor	OX1R		3
Ornithine delta-aminotransferase	OX2R		3
Ormanie della-ammotransierase	OAT	£	Ξ

Ornithine transcarbamoylase Oxytocin Oxytocin receptor Paired box homeotic gene 6 Paired box homeotic gene 8 Palmitoyl-protein thioesterase Pancreatic lipase Paraoxonase PON1	OTC, NME1 OXT OXTR PAX6 PAX8 PPT PNLIP PON1	EZZGGFEE
Paraoxonase PON2	PON2	E
Paraoxonase PON3	, 0112	E
Parathyroid hormone	PTH	Ğ
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	G
Parathyroid hormone-like hormone	PTHLH	G
Peanut-like 1	PNUTL1	l
Peptidylglycine alpha-amidating	PAM	Ε
monooxygenase		
Peroxidase, salivary	SAPX	Ε
Peroxisomal membrane protein 3	PXMP3	T
Peroxisome biogenesis factor 1	PEX1	T
Peroxisome biogenesis factor 19	PEX19	T
Peroxisome biogenesis factor 6	PEX6	T
Peroxisome biogenesis factor 7	PEX7	T
Peroxisome proliferative activated receptor,	PPARA	T
alpha	BBABC	_
Peroxisome proliferative activated receptor,	PPARG	T
gamma B glycoprotoin 1	PGY1	_
P-glycoprotein 1	PGY3	T
P-glycoprotein 3	PAH	T
Phenylalanine hydroxylase Phenylalanine monooxygenase	FAD	E
Phenylethanolamine N-methyltransferase,	PNMT	E
PNMT	LIAIAII	_
Phosphodiesterase 1 / nucleotide	PDNP1	G
pyrophosphatase 1	. 5,	•
Phosphodiesterase 1 / nucleotide	PDNP2	G
pyrophosphatase 2		Ŭ
Phosphodiesterase 1 / nucleotide	PDNP3	G
pyrophosphatase 3		
Phosphoenolpyruvate carboxykinase	PCK1	Ε
Phosphofructokinase, liver	PFKL	E
Phosphofructokinase, muscle	PFKM	Ε
Phosphoglucomutase		Ε
Phosphoglucose isomerase	GPI	Ε
Phosphoglycerate kinase 1	PGK1	Ε
Phosphoglycerate mutase 2	PGAM2	E
Phospholipase A2, group 10	PLA2G10	
Phospholipase A2, group 1B	PLA2G1B	

Phospholipase A2, group 2B Phospholipase A2, group 4A Phospholipase A2, group 4C Phospholipase A2, group 5 Phospholipase A2, group 5 Phospholipase C alpha Phospholipase C beta Phospholipase C delta Phospholipase C gamma Phospholipase C gamma Phospholipase C gamma Phosphomannomutase 2 Phosphomannomutase 2 Phosphomannomutase-2 Phosphoribosyl pyrophosphate synthetase Phosphorylase kinase deficiency, liver Phosphorylase kinase, alpha 1 (muscle) Phosphorylase kinase, alpha 2 Phosphorylase kinase, delta Phosphorylase kinase, delta Phosphorylase kinase, gamma 2 Phytanoyl-CoA hydroxylase Pineolytic beta-receptors Pituitary adenylate cyclase activating peptide Pituitary adenylate cyclase activating peptide		
receptor Plasminogen activator receptor, Urokinase Plasminogen activator, Tissue Plasminogen activator, Urokinase Platelet derived growth factor Platelet derived growth factor receptor Poly (ADP-ribose) synthetase Polycystin 1 Polycystin 2 Porphobilinogen deaminase Potassium inwardly-rectifying channel J1 Potassium inwardly-rectifying channel J1 Potassium voltage-gated channel A1 Potassium voltage-gated channel E1 Potassium voltage-gated channel Q1 Preproenkephalin Preproglucagon Preproglucagon Preproinsulin Profibrinolysin Progesterone receptor (RU486 binding receptor)	UPAR; PLAUR PLAT; TPA UPA; PLAU PDGF PDGFR PARS PKD1 PKD2 HMBS KCNJ1 KCNJ11 KCNJ11 KCNA1 KCNQ1 PENK GCG;GLP1; GLP2 PGR	8
Prolactin	PRL	G

Prolactin receptor Prolactin releasing hormone Proliferin Proline dehydrogenase Proline-rich protein BstNI subfamily 1 Proline-rich protein BstNI subfamily 3 Proline-rich protein BstNI subfamily 4	PRLR PRH PLF PRODH PRB1 PRB3 PRB4	G G G E S S S
Pro-melanin-concentrating hormone Proopiomelanocortin	PMCH POMC	G N
Prophet of Pit1	PROP1	G
Prostacyclin synthase		ı
Prostaglandin (PG) D synthase,	PGDS	Ė
hematopoietic		
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	1
Prostaglandin D - DP receptor		Į.
Prostaglandin E1 receptor		[
Prostaglandin E2 receptor Prostaglandin E3 receptor		
Prostaglandin E3 receptor	•	
Prostaglandin 12 receptor		T
Prostaglandin IP receptor		
Prostaglandin isomerase	•	Ġ
Prostasin, PRSS8	PRSS8	Ē
Protease nexin 2	PN2	Ē
Protein kinase B	PRKB	
Protein kinase C, alpha	PRKCA	. E
Protein S	PROS1	1
Protoporphyrinogen oxidase	PPOX	E
Pterin-4-alpha-carbinolamine	PCBD	
Pyrroline-5-carboxylate synthetase	PYCS	Ε
Pyruvate carboxylase	PC	E
Pyruvate decarboxylase	PDHA	E
Pyruvate kinase	PKLR	E
Quinoid dihydropteridine reductase	QDPR	E
Rathke pouch homeobox, RPX Relaxin H1	RPX RLN1	G
Relaxin H2	RLN2	G G
Renin	REN	· · · E
Replication factor C	RFC2	E
Retinal pigment epithelium specific protein	RPE65	S
(65kD)		•
Retinaldehyde binding protein 1	RLBP1	Ţ
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoid X receptor, alpha	RXRA	G
Retinoid X receptor, beta	RXRB	G
Retinoid X receptor, gamma	RXRG	G

Retinol binding protein 1		T
Retinol binding protein 2		Т
Ribosephosphate pyrophosphokinase		Ε
RIGUI	RIGUI	G
Ryanodine receptor 1, skeletal	RYR1	G
S100 calcium-binding protein A1	S100A1	Ν
S100 calcium-binding protein A2	S100A2	Ν
S100 calcium-binding protein A3	S100A3	Ν
S100 calcium-binding protein A4	S100A4	N
S100 calcium-binding protein A5	S100A5	Ν
S100 calcium-binding protein A6	S100A6	Ν
S100 calcium-binding protein A7	S100A7	N
S100 calcium-binding protein A8	S100A8	N
S100 calcium-binding protein A9	S100A9	N
S100 calcium-binding protein B	S100B	N
S100 calcium-binding protein P	S100P	N
S-adenosylmethionine decarboxylase, AMD	3.33.	E
Salivary amylase, AMY1		T
Secretin	SCT	÷
Secretin receptor, SCTR	SCTR	†
Serine hydroxymethyltransferase	SHMT	Ė
Serotonin N-acetyltransferase	SNAT	E
	HTR1A	
Serotonin receptor, 5HT1A		N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N.
Serotonin receptor, 5HT5	HTR5	Ν
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	Ν
Serum amyloid A	SAA	T
Serum amyloid P	SAP	Т
Sex determining region Y, SRY	SRY	G
Sex hormone binding globulin, SHBG		Т
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	Ν
Sodium channel, non-voltage gated 1,	SCNN1G	Ν
gamma		
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide		- •
Solute carrier family 1 (amino acid	SLC1A6	Т
transporter), member 6		-

Solute carrier family 1 (neutral amino acid transporter), member 4	SLC1A4	τ
Solute carrier family 10 (sodium/bile acid cotransporter family),member 1	SLC10A1	Т
Solute carrier family 10 (sodium/bile acid cotransporter family),member 2	SLC10A2	Τ
Solute carrier family 12, member 1	SLC12A1	Т
Solute carrier family 12, member 2	SLC12A2	T
Solute carrier family 12, member 3	SLC12A2 SLC12A3	
Solute carrier family 14, member 2	SLC12A3 SLC14A2	Ţ
· · · · · · · · · · · · · · · · · · ·	SLC14A2 SLC15A1	T
Solute carrier family 15 (H+/peptide	SECTOAT	_ T
transporter, intestinal), member 1	CLC4EAG	
Solute carrier family 15 (H+/peptide transporter, kidney), member 2	SLC15A2	T .
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	Т
Solute carrier family 16 (monocarboxylate transporter), member 7	SLC16A7	Т
Solute carrier family 17, member 1	SLC17A1	Т
Solute carrier family 17, member 2	SLC17A2	. Ť
Solute carrier family 2 (facilitated glucose	SLC2A1	Ť
transporter), member 1	··	•
Solute carrier family 2 (facilitated glucose transporter), member 2	SLC2A2	Т
Solute carrier family 2 (facilitated glucose	SLC2A3	~
transporter), member 3		Т
Solute carrier family 2 (facilitated glucose transporter), member 4	SLC2A4	Т
Solute carrier family 2 (facilitated glucose	SLC2A5	Т
transporter), member 5		
Solute carrier family 20, member 3	SLC20A3	Т
Solute carrier family 21, member 2	SLC21A2	Τ
Solute carrier family 21, member 3	SLC21A3	T
Solute carrier family 22, member 1	SLC22A1	Т
Solute carrier family 22, member 2	SLC22A2	Т
Solute carrier family 22, member 5	SLC22A5	Т
Solute carrier family 3 (facilitated glucose	SLC3A1	Ť
transporter), member 1	•	·
Solute carrier family 4 (anion exchanger),	SLC4A1	Т
member 1	0201711	•
Solute carrier family 4 (anion exchanger),	SLC4A2	т
member 2	OLOTAL	•
Solute carrier family 4 (anion exchanger),	SLC4A3	Т
member 3	SLOTAS	1
Solute carrier family 5 (sodium/glucose	SI CEA4	
, ,	SLC5A1	T
transporter), member 1	CI CEAO	-
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2		

Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	T
AMINOBUTYRIC ACID transporter), member		
1		
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		•
Solute carrier family 6, member 10	SLC6A10	Т
Solute carrier family 6, member 6	SLC6A6	Ť
Solute carrier family 6, member 8	SLC6A8	Ť
and the second s	SLC7A1	Ť
transporter), member 1	323777	•
	SLC7A2	T.
transporter), member 2	020772	1.
	SLC7A7	Т
transporter), member 7	OLOTAT .	•
	SLC8A1	_
exchanger), member 1	SECOAT	Т
	SST	K.I
	SSTR1	N
_	SSTR2	N
		G
· · · · · · · · · · · · · · · · · · ·	SSTR3	N
	SSTR4	N
	SSTR5	N
Somatotrophin Sorcin	CDI	G
	SRI	T
<u> </u>	SOS1	G
<u>_</u>	PRM1	G
Continue a service time a service ti	PRM2	G
	SMPD1	E
	SOX10	G
	SOX11	G
±		G:
	SOX4	G
	SOX9	G
•	STS	Ε
	STAR	Т
Substance P		Ν
Succinyl CoA synthase		Ε
Sucrase		Ε
	SUR	G
	SOD1	Ε
Superoxide dismutase 3	SOD3	Ε

In a fifteenth aspect.

HEADACHE

The present invention relates to a method of assessing the risk of developing the symptoms of a headache, the causes of which are numerous – including; migraine, trauma, infection, psychiatric conditions and the use of drugs and toxins or as adverse events following the use of drugs (Walton, 1993, Lishman, 1997, Brody. Larner and Minneman 1998).

By far the most common causes of headache and other neurology are various forms of psychogenic and tension headaches and migraine (Lishman, 1997, Ferrari, 1998). Even in neurological clinics less than 5% of headaches are due to serious intracranial structural disease and most of these have additional and obvious neurological features.

It is difficult to assess the prevalence of headache sufferers as many patients will not consult a physician. An estimation of the prevalence of migraine indicates it is remarkably high across western countries, with about 20% of the population suffering at some time in their lives. 5% of the population have at least 18 migraine days per year and 1% at least one day per week. The annual cost of migraine-related lost productivity is enormous.

Classical migraine typically involves visual symptoms such as 'dazzles' or 'blind patches' spreading across the vision of one or both eyes. The headache normally starts as the neurological symptoms resolve. It is often severe lasting hours or rarely days, and may be accompanied by nausea or vomiting. Photophobia, facial pallor, intolerance to certain odours, irritability, mild confusion and anorexia are common. Symptoms of an attack vary enormously but whatever combination of symtoms an individual has an migraine episode is obviously very distressing and debilitating to the sufferer (Ferrari, 1998).

Headaches can be an unwanted side effect of therapeutic drugs, e.g. following treatment with phoshodiesterase 5 inhibitors (ViagraTM), tri-cyclic antidepressants, indomethacin and nifedipine.

Treatment for headaches are primarily in the form of oral treatments but the particular drug used varies widely according to the cause of the headache. Treatment of a tension headache may also include stress avoidance or relaxation programmes together with mild analgesics or mild tranquilizers (e.g diazepam). Acute antimigraine drugs include the ergot alkaloids (ergotamine and dihydroergotamine), sumatriptan, and other 'second generation' triptans (Ferrari, 1998, Brody, Larner and Minneman, 1998).

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

HEADACHE GENE LIST	HUGO symbol	Protein
Acatylahalinaataraaa	40115	function
Acetylcholinesterase	ACHE	Ε
Adenylate cyclase 1	ADCY1	Ε
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	Ε
Adenylate cyclase 4	ADCY4	E
Adenylate cyclase 5	ADCY5	Ε
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	E
Adenylate cyclase 8	ADCY8	E
Adenylate cyclase 9	ADCY9	Ε
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	Ğ
Angiotensin converting enzyme	ACE, DCP1	E
Angiotensin receptor 1	AGTR1	Ť
Angiotensin receptor 2	AGTR2	Ť
Angiotensinogen	AGT	É
Arginase	ARG1	E
Arginine vasopressin	AVP	N
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	
Atrial natriuretic peptide receptor C	NPR3	G
Calcitonin/Calcitonin gene-related peptide	CALCA	G
alpha	CALCA	N
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	N
subunit		1.4
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		14
Calcium channel, voltage-dependent, Alpha-	CACNA1C	N
1C	CACITATIO	14
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N
1D	CACIALD	1.4

Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	Ν
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	N
Calcium channel, voltage-dependent, Beta 3	CACNB3	N
Calcium channel, voltage-dependent, Beta 9	CACNG2	
- ,	CACINGZ	Ν
Neuronal, Gamma	O A ONLA 4 A	
Calcium channel, voltage-dependent, P/Q	CACNA1A	Ν
type, alpha 1A subunit		
Calcium channel, voltage-dependent, T-type		Ν
Calnexin	CANX	G
Cannabinoid receptor	CNR1	Ν
Carbonic anhydrase 3	CA3	Ε
Carbonic anhydrase 4	CA4	Ε
Carbonic anhydrase, alpha	CA1	Ε
Carbonic anhydrase, beta	CA2	E
Catechol-O-methyltransferase	COMT	Ē
Choline acetyltransferase	CHAT	Ē
Cyclic AMP-dependent protein kinase	PKA	Ē
Cyclic nucleotide phosphodiesterase 1B	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	E
		E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	E
Cyclic nucleotide phosphodiesterase 3B	PDE3B	E
Cyclic nucleotide phosphodiesterase 4A	PDE4A	Ε
Cyclic nucleotide phosphodiesterase 4C	PDE4C	E
Cyclic nucleotide phosphodiesterase 5A	PDE5A	Ε
Cyclic nucleotide phosphodiesterase 6A	PDE6A	Ε
Cyclic nucleotide phosphodiesterase 6B	PDE6B	Ε
Cyclic nucleotide phosphodiesterase 7	PDE7	E
Cyclic nucleotide phosphodiesterase 8	PDE8	Ε
Cyclic nucleotide phosphodiesterase 9A	PDE9A	Ε
Cyclooxygenase 1	COX1	E
Cyclooxygenase 2	COX2	Ē
CYP11A1	CYP11A1	Ē
CYP11B1	CYP11B1	Ē
CYP11B2***	CYP11B2	E
CYP17	CYP17	
CYP19	CYP19	E
CYP1A1	CYP1A1	
		E
CYP1A2	CYP1A2	E
CYP1B1	CYP1B1	Ε
CYP21	CYP21	Ε
CYP24	CYP24	Е
CYP27	CYP27	Ε
CYP27B1	PDDR	E
CYP2A1	CYP2A1	Ε

·		
CYP2A13	CYP2A13	Ε
CYP2A3	CYP2A3	Ε
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A7	E
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	
CYP2C19		E
	CYP2C19	E
CYP2C8	CYP2C8	Ε
CYP2C9	CYP2C9	Ε
CYP2D6	CYP2D6	Ε
CYP2E1	CYP2E1	Ε
CYP2F1	CYP2F1	Ε
CYP2J2	CYP2J2	Ε
CYP3A3	CYP3A3	E
CYP3A4	CYP3A4	Ē
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	E
CYP4B1	CYP4B1	
CYP4F2		Ē
	CYP4F2	E
CYP4F3	CYP4F3	E
CYP51	CYP51	Ε
CYP5A1	CYP5A1	Ε
CYP7A	CYP7A	Ε
CYP8	CYP8	Ε
Cystathionase	CTH	Ε
Cystathione beta synthase	CBS	Ε
Cytidine deaminase	CDA	E
Cytidine-5-prime-triphosphate synthetase	CTPS	Ē
Cytochrome a		Ē
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	CSBP1	
binding protein 1	CSBFT	1
	OCDDO	
Cytokine-suppressive antiinflammatory drug-	CSBP2	ı
binding protein 2		
Dopamine beta hydroxylase	DBH	E
Dopamine receptors D1	DRD1	Ν
Dopamine receptors D2	DRD2	Ν
Dopamine receptors D3	DRD3	Ν
Dopamine receptors D4	DRD4	Ν
Dopamine receptors D5	DRD5	Ν
Dystonia 9	CSE	S
Endothelin 1	EDN1	N
Endothelin 2	EDN2	N
Endothelin 3	EDN3	
Endothelin converting enzyme		N
	ECE1	N
Endothelin receptor type A	EDNRA	N

Endothelin receptor type B Enolase Epidermal growth factor Epidermal growth factor receptor Erythropoietin receptor Glutathione	EDNRB ENO1 EGF EGFR EPOR GSH	N E G G I
Glutathione S-transferase, GSTZ1 Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GSTZ1 GAPDH	E
Glycerol kinase	GK	Ε
Glycinamide ribonucleotide (GAR)	GART	Ē
transformylase		_
Hexosaminidase B	HEXB	Ε
Histamine receptors, H1		·N
Histamine receptors, H2		N
Histamine receptors, H3		N
Hypoxia inducible factor 1	HIF1A	E
Hypoxia inducible factor 2		E
Insulin	INS	G
Insulin receptor	INSR	G
Interleukin(IL) 1, alpha	IL1A	1
Interleukin(IL) 1, beta	IL1B	i
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	i
IP3 kinase		Ė
Marenostrin	MEFV	T
Methylmaionyl-CoA mutase	MUT	Ė
Monoamine oxidase A	MAOA	Ē
Monoamine oxidase B	MAOB	Ē
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Myogenic factor 3	MYF3	G
Myogenic factor 4	MYF4	G
Myogenic factor 5	MYF5	Ğ
NADH dehydrogenase	•	Ē
	POR	E
reductase		_
Neurokinin A	NKNA	Ν
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Nitric oxide synthase 1, NOS1	NOS1	E
Nitric oxide synthase 2, NOS2	NOS2	E
Nitric oxide synthase 3, NOS3	NOS3	Ē
Phospholipase A2, group 10	PLA2G10	1

Phoenhalings A2 group 4D	DI 4004D	
Phospholipase A2, group 1B	PLA2G1B	1
Phospholipase A2, group 2A	PLA2G2A	ı
Phospholipase A2, group 2B	PLA2G2B	- 1
Phospholipase A2, group 4A	PLA2G4A	1
Phospholipase A2, group 4C	PLA2G4C	- 1
Phospholipase A2, group 5	PLA2G5	1
Phospholipase A2, group 6	PLA2G6	-
Phospholipase C alpha		- 1
Phospholipase C beta		1
Phospholipase C delta	PLCD1	- 1
Phospholipase C epsilon		- 1
Phospholipase C gamma	PLCG1	I
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium voltage-gated channel E1	KCNE1	Ν
Potassium voltage-gated channel Q1	KCNQ1	N
Proopiomelanocortin	POMC	N
RIGUI	RIGUI	G
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma	SCNN1G	N
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide		
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ACID transporter), member 1		•
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		•
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		•
Substance P		N
Tyrosine hydroxylase	TH	E
UDP-glucuronosyltransferase 1	ugt1d, UGT1	Ē
UDP-glucuronosyltransferase 2	UGT2	E
Vasoactive intestinal polypeptide	VIP	N
the state of the s		

Vasoactive intestinal polypeptide receptor

VIPR

 \cdot N

In a sixteenth aspect.

SEXUAL DYSFUNCTION

The present invention relates to a method of assessing the risk of developing the symptoms of sexual dysfunction in women and men and impotence or erectile dysfunction in men. Sexual dysfunction is a common consequence of psychiatric or neuropsychiatric disorders or following traumatic brain injury, ischaemic brain damage or stroke or systemic diseases (such as cardiovascular disease) or following psychological or social stress.

Sexual dysfunction arises in a significant majority of cases as a result of a recognisable physical or physiological condition. Causes include, dysfunctional reglation of the vasculaure, diabetes, peripheral neuropathy, peyronies disease, prostate disease and neurological lesions (such as those following spinal cord trauma. However, it is also of importance to note that sexual dysfunction is commonly observed as a consequence of individuals experiencing psychological or social stress following difficulties in their interpersonal relationships, work relationships or other concerns resulting from their social or economic circumstances.

Sexual dysfuction is also a common adverse event following standard therapeutic practices and is a known adverse event following treatments with anti-depressants, anti-convulsants, anti-psychotics, cholinomimetics, sympathomimetic and sympatholytics (Brody, Larner and Minneman 1998).

The symptoms of sexual dysfunction are a cause of significant anxiety and stress in patients or persons suffering from them. The problem of sexual dysfunction is a large one with an estimated 20 million Americann males suffering from some aspect of sexual difficulties.

Such symptoms lead to difficulties in the clinical care of patients, difficulties in the treatment and recovery of patients and lead to stress and anxiety in their carers and families.

Treatment of sexual dysfunction has traditionally been via hormone replacement or supplementation, urethral suppositories, penile injections or implant surgery. Recently oral treatments such as phosphodiesterase 5 inhibitors have also become available (e.g. ViagraTM from Pfizer).

There is as yet no clear explanation as to why sexual dysfunction should affect some and not others or why some suffer from sexual dysfunction as a result of therapeutic intervenion wheras others do not. The biology underpinning the appearance of sexual dysfunction is uncertain and its genetic background unknown (OMIM Database 1998).

The uncertainties surrounding sexual dysfunction have been heightened in recent months following the availability of oral treatments for the problem and the realisation that these treatments are not 100% effective in the whole population.

It is presumed that a similar (although perhaps less extreme) physiology underlies the expression of the symptoms of sexual dysfunction in persons who experience these difficulties without the background of a diagnosable disease or psychiatric condition.

Although little is known concerning the pathophysiology of sexual dysfunction it has been observed that there is considerable inter-personal variation in the likelihood, threshold and magnitude of sexual dysfunction even in persons suffering from the same clinical condition or experiencing the same social or economic conditions (Lishman 1997).

We have elaborated on the value and utility to be derived from the gathering together of the genes which form the core gene list for this particular Genostic system.

These genes are elaborated below:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

SEXUAL DYSFUNCTION GENE LIST	HUGO symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	E
Acetylcholinesterase	ACHE `	E
Activin		G
Adenylate cyclase 1	ADCY1	E
Adenylate cyclase 2	ADCY2	Ε
Adenylate cyclase 3	ADCY3	E E
Adenylate cyclase 4	ADCY4	E
Adenylate cyclase 5	ADCY5	E
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	Ε
Adenylate cyclase 8	ADCY8	E
Adenylate cyclase 9	ADCY9	Ε
Adrenergic receptor, alpha1	ADRA1	Ν "
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	Ν
Adrenoleukodystrophy gene	ALD	E
alpha thalassemia gene	ATRX	N
Androgen binding protein	ABP	Т
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	E

Angiotensin receptor 1	AGTR1	Т
Angiotensin receptor 2	AGTR2	Ť
Angiotensinogen	AGT	E
Anti-Mullerian hormone	AMH	Ğ
Anti-Mullerian hormone type 2 receptor	AMHR2	Ğ
Arginase	ARG1	E
Arginine vasopressin	AVP	N
Arginine vasopressin receptor 1A	AVPR1A	N
Arginine vasopressin receptor 1B	AVPR1B	N
Arginine vasopressin receptor 2	AVPR2	N
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
Autoimmune regulator, AIRE	AIRE	Ī
BCL2-associated X protein	BAX	Ġ
Bloom syndrome protein	BLM	G
Calcium channel, voltage-dependent, alpha 1F		N
subunit		•
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		• •
Calcium channel, voltage-dependent, Alpha-	CACNA1C	N
1C		• •
Calcium channel, voltage-dependent, Alpha-	CACNA1D	Ν
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	Ν
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	Ν
2/delta		
	CACNB1	Ν
	CACNB3	Ν
	CACNG2	N
Neuronal, Gamma		
Calcium channel, voltage-dependent, T-type		Ν
Carbonic anhydrase 3	CA3	Ε
	CA4	Ε
· · · · · · · · · · · · · · · · · · ·	CA1	Ε
	CA2 **	E
	COMT	Ε
Choline acetyltransferase	CHAT	E
· ·	CREM	G
Cyclic AMP-dependent protein kinase	PKA `	E
	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	Ε
	PDE2A3	Ε
	PDE3A	Ε
	PDE3B	E
Cyclic nucleotide phosphodiesterase 4A	PDE4A	Ε

Cyclic nucleotide phosphodiesterase 4C Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclocxygenase 1 Cyclocxygenase 2 CYP11A1 CYP11B1 CYP11B2	PDE4C PDE5A PDE6A PDE6B PDE7 PDE8 PDE9A COX1 COX2 CYP11A1 CYP11B1 CYP11B2	
CYP17	CYP17	Ē
CYP19	CYP19	Ε
CYP1A1	CYP1A1	Ε
CYP1A2	CYP1A2	E
CYP1B1	CYP1B1	E
CYP21	CYP21	E
CYP24	CYP24	E
CYP27 CYP27B1	CYP27 PDDR	E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	E
CYP2A6V2	CYP2A6V2	Ē
CYP2A7	CYP2A7	Ē
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	E
CYP2C19	CYP2C19	Ε
CYP2C8	CYP2C8	Ε
CYP2C9	CYP2C9	Ε
CYP2D6	CYP2D6	Ε
CYP2E1	CYP2E1	E
CYP2F1	CYP2F1	E
CYP2J2	CYP2J2	E
CYP3A3	CYP3A3	E
CYP3A4 CYP3A5	CYP3A4	Ε
CYP3A7	CYP3A5 CYP3A7	Έ
CYP4A11	CYP4A11	E
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	E
CYP4F3	CYP4F3	Ē
CYP51	CYP51	Ē
CYP5A1	CYP5A1	Ē
CYP7A	CYP7A	E
CYP8	CYP8	E
Cystathionase	CTH	Ε

	Cystathione beta synthase Cytidine deaminase Cytidine-5-prime-triphosphate synthetase Cytochrome a Cytochrome c Cytochrome c oxidase, MTCO Cytokine-suppressive antiinflammatory drug-	CBS CDA CTPS	
	binding protein 1		•
	Cytokine-suppressive antiinflammatory drug-	CSBP2	ı
	binding protein 2 DAX1 nuclear receptor	DAX1	1
	Deleted in azoospermia	DAZ	Ġ
	Diaphanous 2	DIAPH2	N
	Disrupted meiotic cDNA 1, homolog	DMC1	G
	Dopamine beta hydroxylase	DBH	Ē
	Dopamine receptors D1	DRD1	N
	Dopamine receptors D2	DRD2	N
	Dopamine receptors D3	DRD3	Ν
	Dopamine receptors D4	DRD4	Ν
	Dopamine receptors D5	DRD5	Ν
	Electron-transfering-flavoprotein alpha	ETFA	T
	Electron-transfering-flavoprotein beta	ETFB	Т
	Electron-transferring flavoprotein	ETFDH	Ε
	dehydrogenase		
	Endometrial bleeding-associated factor	EBAF	G
	Endothelin 1	EDN1	N
	Endothelin 2	EDN2	N
	Endothelin 3	EDN3	N
	Endothelin converting enzyme	ECE1	N
	Endothelin receptor type A	EDNRA	N
	Endothelin receptor type B	EDNRB	N
	Enolase	ENO1	E
	Enoyl CoA isomerase Enterokinase	DDCC7 ENTIZ	E
	Epidermal growth factor	PRSS7, ENTK	E
	Epidermal growth factor receptor	EGF EGFR	G
	Faciogenital dysplasia	FGD1, FGDY	G T
,	Factor XIII A & B	F13A & F13B	i '
	Fanconi anemia, complementation group A	FANCA	Ť
	Fertilin protein	FTNB	Ġ
	Flightless-II, Drosophila homolog of	FLII	G
	Folic acid receptor	FOLR	Ğ
	Glutathione	GSH	Ť
	Glutathione S-transferase, GSTZ1	GSTZ1	E
	Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	E
	GAPDH		
	Glycerol kinase	GK	E
	Glycinamide ribonucleotide (GAR)	GART	Ε

transformylase		
Glycogen phosphorylase	PYGL	Е
Gonadotropin releasing hormone	GNRH	G
Gonadotropin releasing hormone receptor	GNRHR	G
Guanine nucleotide-binding protein, alpha	GNAI1	N
inhibiting activity polypeptide 1, GNAI1	CHAIT	IN
Guanine nucleotide-binding protein, alpha	GNAI2	N
inhibiting activity polypeptide 2, GNAI2	OIW WE	IN
Guanine nucleotide-binding protein, alpha	GNAI3	N
inhibiting activity polypeptide 3, GNAI3	0,0,00	14
Hexosaminidase B	HEXB	Е
Holoprosencephaly 1	HPE1	Ğ
Holoprosencephaly 2	HPE2	G
Holoprosencephaly 3	HPE3	G
Holoprosencephaly 4	HPE4	Ğ
Human placental lactogen	CSH1	Ğ
Inhibin, alpha	INHA	G
Inhibin, beta A	INHBA	Ğ
Inhibin, beta B	INHBB	Ğ
Inhibin, beta C	INHBC	G
Insulin	INS	G
Insulin receptor	INSR	G
IP3 kinase		Ε
Kallman syndrome gene 1	KAL1	G
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin receptor 1	LAMR1	G
Long QT-type 2 potassium channels	LQT2, KCNH2	T
Luteinizing hormone, beta chain	LHB	G
MAD (mothers against decapentaplegic,	MADH2	G
Drosophila) homologue 2		
Methylmalonyl-CoA mutase	MUT	E
Monoamine oxidase A	MAOA	E
Monoamine oxidase B	MAOB	E
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	, N
Muscarinic receptor, M5	CHRM5	N
NADPH-dependent cytochrome P450	POR	, E
reductase	NDV	N.I
Neuropeptide Y	NPY NDV1D	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2 Nitric oxide synthase 1, NOS1	NPY2R	N
Nitric oxide synthase 1, NOS1 Nitric oxide synthase 2, NOS2	NOS1 NOS2	E
Nitric oxide synthase 2, NOS2 Nitric oxide synthase 3, NOS3	NOS2 NOS3	E
Oncogene ELK1	ELK1	
Ollondelle EFICI	CLNI	G

Oncogene ELK2	ELK2	G
Paired box homeotic gene 3	PAX3	G
Patched (Drosophila) homolog, PTCH	PTCH	G
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	
Potassium voltage-gated channel A1	KCNA1	N
Potassium voltage-gated channel E1	KCNA1 KCNE1	N
The second secon		N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	Ν
Progesterone receptor (RU486 binding	PGR	G
receptor)		
Proopiomelanocortin	POMC	Ν
Prostasin, PRSS8	PRSS8	Ε
Ribosomal protein S4, X-linked	RPS4X	Ε
RIGUI	RIGUI	G
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma		
Sodium channel, voltage gated, type V, alpha	SCN5A	N
polypeptide	SCNSA	Ν
Sodium channel, voltage-gated, type 1, beta	SCN1B	
polypeptide	SCIVIB	Ν
• • •	01.0044	_
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member 1	01.004.0	
Solute carrier family 6 (neurotransmitter	SLC6A3	T
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		
Sperm protamine P1	PRM1	G
Sperm protamine P2	PRM2	G
T-BOX 3	TBX3	G
Testis-specific protein Y	TSPY	G
Tyrosine hydroxylase	TH	Ε

UDP-glucuronosyltransferase 1	ugt1d, UGT1	E
UDP-glucuronosyltransferase 2	UGT2	E
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	N
Zona pellucida glycoprotein 1	ZP1	G
Zona pellucida glycoprotein 2	ZP2	G
Zona pellucida glycoprotein 3	ZP3	Ğ
Zona pellucida receptor tyrosine kinase	ZRK	Ğ
Zonadhesin	ZAN	G

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CLAIMS

1. A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to adverse events; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

ADME GENE LIST	HUGO gene symbol	Protein function
5-adenosyl homocysteine hydrolase	•	Ε
Acetoacetyl 1-CoA-thiolase	ACAT1	E
Acetoacetyl 2-CoA-thiolase	ACAT2	E
Acetyl CoA acyltransferase	ACAA	E
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	, N ,
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Actin, beta	ACTB	S
Actin, gamma 2	ACTG2	S S S
Acyl CoA dehydrogenase, short chain	ACADS	E

Adenosine deaminase Adenosine monophosphate deaminase Adenosine receptor A1 Adenosine receptor A2A Adenosine receptor A2B Adenosine receptor A3 Adenosine receptor A3 Adenylate cyclase 1 Adenylate cyclase 2 Adenylate cyclase 3 Adenylate cyclase 4 Adenylate cyclase 5 Adenylate cyclase 5 Adenylate cyclase 6 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 9 Adenylate cyclase 9 Adenylate transferase Adenylate transferase Adenylosuccinate lyase ADP-ribosyltransferase Adrenergic receptor, alpha1 Adrenergic receptor, beta1 Adrenergic receptor, beta2	APRT ADA AMPD ADORA1 ADORA2A ADORA2B ADORA3 ADCY1 ADCY2 ADCY3 ADCY4 ADCY5 ADCY6 ADCY6 ADCY7 ADCY8 ADCY9 AK1 ADSL ADPRT ADRA1 ADRA2 ADRB1 ADRB2	
Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH)	ADRB3 ACTHR	N G
receptor Adrenoleukodystrophy gene Albumin, ALB Alkaptonuria gene Alpha 1 acid glycoprotein alpha1-antitrypsin alpha2-antiplasmin alpha-amylase Alpha-fetoprotein alpha-glucosidase, neutral AB alpha-glucosidase, neutral C Aminomethyltransferase Aminopeptidase P Amyloid beta (A4) precursor protein-binding, APBB1	ALD ALB AKU AAG; AGP PI PLI AFP GANAB GANC AMT XPNPEP2 APBB1	ETGTEEEGEEER .
Amyloid beta A4 precursor protein Androgen binding protein Androgen receptor Angiotensin converting enzyme Angiotensin receptor 1 Angiotensin receptor 2 Angiotensinogen	APP ABP AR ACE, DCP1 AGTR1 AGTR2 AGT	N T G E T T E

Annexin 1	ANX 1	ı
Apurinic endonuclease	APE	E
Arginine vasopressin	AVP	Ν
Arginine vasopressin receptor 1A	AVPR1A	Ν
Arginine vasopressin receptor 1B	AVPR1B	N
Arginine vasopressin receptor 2	AVPR2	N
Aryl hydrocarbon receptor	AHR	Т
Arylsulfatase E	ARSE	Ė
Aspartate transcarbamoylase		Ē
Ataxia telangiectasia gene, AT	ATM	G
ATP cobalamin adenoxyltransferase		E
ATP sulphurylase	atpsk2	Ē
ATP/ADP translocase	a.pon2	E
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	
Atrial natriuretic peptide receptor C	NPR3	G
BCL2-associated X protein	BAX	G
Benzodiazepine receptor	DAX .	G
•		N
beta-endorphin receptor	DAAT.	N
Bile acid coenzyme A: amino acid N-	BAAT	Е
acyltransferase	2052 25102	_
Bile salt export pump	BSEP, PFIC2	T
Bile salt-stimulated lipase	CEL	Ε
Bilirubin UDP-glucuronosyltransferase		Ε
Biliverdin reductase		T
Biliverdin reductase Bleomycin hydrolase	BLMH	
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1	BLMH	T
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2	BLMH	T
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1	BLMH	T
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2		T E I
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region	BCR	T E I G G
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1	BCR BRCA1	TEIIGGG
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2	BCR BRCA1	TEIIGGGE
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase	BCR BRCA1 BRCA2 BCHE	TEIIGGGEE
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch	BCR BRCA1 BRCA2 BCHE ATP2A1	TEIIGGGE
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2	TEIIGGGEE
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1	TEIIGGGEE
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2	TEIIGGGEE
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin A3	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1	TEIIGGGEE
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin B	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2 CALNA3	TEIIGGGEETTIII
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin B Calcitonin receptor /Calcitonin gene-related	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2	TEIIGGGEE
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin B Calcitonin receptor /Calcitonin gene-related peptide receptor	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2 CALNA3 CALCR	TEIIGGGEETTIIIIN
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin A3 Calcineurin B Calcitonin receptor /Calcitonin gene-related peptide receptor Calcium channel, voltage-dependent, alpha 1F	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2 CALNA3 CALCR	TEIIGGGEETTIII
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin A3 Calcineurin B Calcitonin receptor /Calcitonin gene-related peptide receptor Calcium channel, voltage-dependent, alpha 1F subunit	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2 CALNA3 CALCR CACNA1F	TEIIGGGEETTIIIIN N
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin B Calcitonin receptor /Calcitonin gene-related peptide receptor Calcium channel, voltage-dependent, alpha 1F subunit Calcium channel, voltage-dependent, Alpha-	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2 CALNA3 CALCR	TEIIGGGEETTIIIIN
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin A3 Calcineurin B Calcitonin receptor /Calcitonin gene-related peptide receptor Calcium channel, voltage-dependent, alpha 1F subunit Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2 CALNA3 CALCR CACNA1F CACNA1B	TEIIGGGEETTIIIIN N N
Biliverdin reductase Bleomycin hydrolase Bradykinin receptor B1 Bradykinin receptor B2 Breakpoint cluster region Breast cancer 1 Breast cancer 2 Brush border guanylyl cyclase Butyrylcholinesterase Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch Calcineurin A1 Calcineurin A2 Calcineurin B Calcitonin receptor /Calcitonin gene-related peptide receptor Calcium channel, voltage-dependent, alpha 1F subunit Calcium channel, voltage-dependent, Alpha-	BCR BRCA1 BRCA2 BCHE ATP2A1 ATP2A2 CALNA1 CALNA2 CALNA3 CALCR CACNA1F	TEIIGGGEETTIIIIN N

Calcium channel, vo	oltage-dependent, Alpha-	CACNA1D		N
	oltage-dependent, Alpha-	CACNA1E		N
	oltage-dependent, Alpha-	CACNA2	•	N
	oltage-dependent, Beta 1	CACNB1		N
	oltage-dependent, Beta 3	CACNB3		N
Calcium channel, vo	oltage-dependent, L type,	CACNA1S		N
alpha 1S subunit Calcium channel, vo	oltogo donondont	CACNICO		
Neuronal, Gamma	onage-dependent,	CACNG2	٠	N
	oltage-dependent, P/Q	CACNA1A		Ν
type, alpha 1A subu	ınit			
Calcium channel, vo	oltage-dependent, T-type			N
Canalicular multispe	ecific organic anion	CMOAT		• Т
transporter				•
Cannabinoid recept		CNR1		Ν
Carbamoylphospha		CPS1		E
Carbamoylphospha	•	CPS2		Ε
Carbonic anhydrase		ÇA3		E
Carbonic anhydrase		CA4		Ε
Carbonic anhydrase	•	CA1		Ε
Carbonic anhydrase		CA2		E
Carnitine transporte	r protein	CDSP, SCD		Т
Carnosinase				N
Cartilage-hair hypop	olasia gene	CHH		Ν
Catalase	•	CAT		1
Catechol-O-methyltr	ransferase	COMT		Ε
Catenin, beta		CTNNB1		G
	cule, vascular, VCAM	VCAM1		G
Cholecystokinin	·	CCK		Ν
Cholecystokinin B re		CCKBR .		Ν
Cholesterol ester tra		CETP		Т
Choline acetyltransf	erase	CHAT		E
CoA transferase				Ε
Colony-stimulating fa		CSF1		G
Colony-stimulating fa		CSF2	the state of	··· G
Colony-stimulating fa		CSF3		G
Colony-stimulating fa	actor 3 receptor	CSF3R	•	G
Complex V		MTATP6		E
Coproporphyrinoger		CPO		E
Cortico-steroid bindi				Т
Corticosteroid nucle	•			1
•	sing hormone receptor	CRHR1		Т
Creb binding protein	l	CREBBP		G
Crystallin, alpha A		CRYAA		S
Crystallin, alpha B		CRYAB	•	, S

Crystallin, beta B2	CRYBB2	s
Crystallin, gamma A	CRYGA	S
Cu2+ transporting ATPase alpha polypeptide	ATP7A	Ε
Cu2+ transporting ATPase beta polypeptide	ATP7B	E
Cyclic AMP response element binding protein	CREB	Ğ
Cyclic AMP response element modulator	CREM	Ğ
Cyclic AMP-dependent protein kinase	PKA	Ē
Cyclic nucleotide phosphodiesterase 1B	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	Ē
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	E E E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	Ε
Cyclic nucleotide phosphodiesterase 3B	PDE3B	Ε
Cyclic nucleotide phosphodiesterase 4A	PDE4A	. E
Cyclic nucleotide phosphodiesterase 4C	PDE4C	· E
Cyclic nucleotide phosphodiesterase 5A	PDE5A	E
Cyclic nucleotide phosphodiesterase 6A	PDE6A	Ε
Cyclic nucleotide phosphodiesterase 6B	PDE6B	E
Cyclic nucleotide phosphodiesterase 7	PDE7	
Cyclic nucleotide phosphodiesterase 8	PDE8	E
Cyclic nucleotide phosphodiesterase 9A	PDE9A	Ε
Cyclin F	CCNF	G
Cyclin-dependent kinase inhibitor 1A (P21,	CDKN1A	G
CIP1)		
Cyclooxygenase 1	COX1	Ε
Cyclooxygenase 2	COX2	Ε
Cyclophilin		E
Cyclophilin CYP11A1	CYP11A1	I E
Cyclophilin CYP11A1 CYP11B1	CYP11A1 CYP11B1	I E E
Cyclophilin CYP11A1 CYP11B1 CYP11B2	CYP11A1 CYP11B1 CYP11B2	I E E
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17	CYP11A1 CYP11B1 CYP11B2 CYP17	I E E E E
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A1 CYP1A2 CYP1B1	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A1 CYP1A2 CYP1B1 CYP21	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A1 CYP1A2 CYP1B1 CYP21	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP27 CYP27	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP27 CYP27	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP21 CYP24 CYP27 CYP27B1 CYP2A1 CYP2A13	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A13	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1A1 CYP21 CYP21 CYP24 CYP27 CYP27 CYP27B1 CYP2A1 CYP2A13 CYP2A3	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A13 CYP2A3	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1A1 CYP21 CYP21 CYP24 CYP27 CYP27 CYP27B1 CYP2A1 CYP2A1 CYP2A3 CYP2A6V2	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A13 CYP2A3 CYP2A6V2	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1A1 CYP21 CYP21 CYP24 CYP27 CYP27B1 CYP2A1 CYP2A1 CYP2A3 CYP2A3 CYP2A7	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A13 CYP2A3 CYP2A6V2 CYP2A7	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 CYP27B1 CYP2A1 CYP2A13 CYP2A3 CYP2A7 CYP2B6	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A1 CYP2A13 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 CYP27 CYP27B1 CYP2A1 CYP2A13 CYP2A3 CYP2A6V2 CYP2B6 CYP2C18	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A13 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1A1 CYP21 CYP24 CYP27 CYP27 CYP27 CYP27B1 CYP2A1 CYP2A1 CYP2A3 CYP2A3 CYP2A7 CYP2B6 CYP2C18 CYP2C19	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A13 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C19	
Cyclophilin CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 CYP27 CYP27B1 CYP2A1 CYP2A13 CYP2A3 CYP2A6V2 CYP2B6 CYP2C18	CYP11A1 CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 PDDR CYP2A1 CYP2A13 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18	

CYP2D6	CYP2D6	Ε
CYP2E1	CYP2E1	E
CYP2F1	CYP2F1	E
CYP2J2	CYP2J2	E
CYP3A3	CYP3A3	
CYP3A4	CYP3A4	Ε
		E
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	Ε
CYP4A11	CYP4A11	Ε
CYP4B1	CYP4B1	Ε
CYP4F2	CYP4F2	Ε
CYP4F3	CYP4F3	Ε
CYP51	CYP51	Ε
CYP5A1	CYP5A1	Ε
CYP7A `	CYP7A	Ε
CYP8	CYP8	Ε
Cystic fibrosis transmembrane conductance	CFTR	N
regulator, CFTR		
Cytidine deaminase	CDA	Ε
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytokine-suppressive antiinflammatory drug-	CSBP1	ī
binding protein 1		•
Cytokine-suppressive antiinflammatory drug-	CSBP2	1
binding protein 2		•
Deoxycytidine kinase DCK		E
Deoxyuridine triphosphatase; dUTPase		Ē
· · · · · · · · · · · · · · · · · · ·	STD	E
Dihydrodiol dehydrogenase 1	DDH1	Ē
Dihydrofolate reductase	DHFR	Ē
Dihydrolipoamide branched chain transacylase		N
Dihydrolipoamide dehydrogenase	DLD	
• •	PDHA	N
Dihydrolipoyl dehydrogenase 2		E
Dihydrolipoyl transacetylase	PDHA	E
Dihydroorotase	DD)/D	Ε
Dihyropyrimidine dehydrogenase	DPYD	E
Disrupted meiotic cDNA 1, homolog	DMC1	G
DNA damage binding protein, DDB1	DDB1	S
DNA damage binding protein, DDB2	DDB2	S
DNA directed polymerase, alpha	POLA	Ε
DNA glycosylases		Ε
DNA helicases		Ε
DNA Ligase 1	LIG1	Ε
DNA methyltransferase	DNMT	Ε
DNA polymerase 1		Ε
DNA polymerase 2		Ε
DNA polymerase 3		Ε
DNA primase		E
DNA-damage-inducible transcript 3	DDIT3	S
	•	

DNA-dependant RNA polymerase Dopamine receptors D1	DRD1	E N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N.
Dopamine receptors D4	DRD4	N
Dopamine receptors D5	DRD5 EPO	N
Erythropoietin Erythropoietin receptor	EPOR	
Estrogen receptor	ESR	Ġ
Excision repair complementation group 1	ERCC1	Ë
protein		_
Excision repair complementation group 2	ERCC2	E
protein		
Excision repair complementation group 2	ERCC3	Ε
protein		_
Excision repair complementation group 4	ERCC4	E
protein	ERCC6	_
Excision repair complementation group 6 protein	ERCCO	E
Factor H	HF1	. 1
Factor IX	F9	i
Factor VII	F7	j
Factor VIII	F8	1
Factor X	F10	ŀ
Fatty acid binding proteins FABP1		Т
Fatty acid binding proteins FABP2	FABP2	<u>T</u>
Fatty acid binding proteins FABP3	•	T
Fatty acid binding proteins FABP5		Ţ
Fatty acid binding proteins FABP5 Fatty acid binding proteins FABP6		T T
Fibroblast growth factor	FGF1	Ġ
Flavin-containing monooxygenase 1	FMO1	E
Flavin-containing monooxygenase 2	FMO2	Ē
Flavin-containing monooxygenase 3	FMO3	· E
Flavin-containing monooxygenase 4	FMO4	Е
Folic acid receptor	FOLR	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Forkhead transcription factor 10	FKHL10	G
Forkhead transcription factor 14	FKHL14	G
Forkhead transcription factor 7 G/T mismatch binding protein	FKHL7 GTBP, MSH6	G G
GABA receptor, alpha 1	GABRA1	N
GABA receptor, alpha 2	GABRA2	N
GABA receptor, alpha 3	GABRA3	N
GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	N

GABRB1 GABRB2 GABRB3 GABRG1 GABRG2 GABRG3 ABAT Die protein) GALT GGCX GGT1 GGT2 GIPR GCGR GRL GCNT2	NNNNNEEETTTTTGGE
GBA GAD1 GLUR1 GLUR2 GLUR3 GLUR4 GLUR5 GLUR6 GLUR7 NMDAR1 NMDAR2A NMDAR2B NMDAR2C NMDAR2D otransferase/PRPP	
GSH GPX1 GPX2 GSR GSTM1 GSTT1 GSTP1 GSTZ1 GSS GAPDH GART	
	GABRB2 GABRB3 GABRG1 GABRG2 GABRG3 ABAT ble protein) GALT GGCX GGT1 GGT2 GIPR GCGR GRL GCNT2 GBA GAD1 GLUR1 GLUR2 GLUR3 GLUR4 GLUR5 GLUR4 GLUR5 GLUR6 GLUR7 NMDAR1 NMDAR2A NMDAR2A NMDAR2D otransferase/PRPP GSH GPX2 GSR GSTM1 GSTT1 GSTT1 GSTT1 GSTP1 GSS GAPDH

transformylase		
Glycine receptor, alpha	GLRA2	Ν
Glycine receptor, beta		N
Glycine transporter	GLYT	N
Gonadotropin releasing hormone	GNRH	G
Gonadotropin releasing hormone receptor	GNRHR	G
Growth arrest-specific homeobox	GAX	G
Growth hormone 1	GH1	G
Growth hormone 2 (placental)	GH2	G
Growth hormone receptor	GHR	G
Growth hormone releasing hormone (GHRH)	GHRH	G
Growth hormone releasing hormone receptor	GHRHR	G
GTP cylcohydrolase 1	GCH1	G
GTPase-activating protein, GAP	RASA1	G
Guanidinoacetate N-methyltransferase	GAMT	E
Guanine nucleotide-binding protein, alpha	GNAO1	N
activating activity polypeptide, GNAO		IV
Guanine nucleotide-binding protein, alpha	GNAI1	N
inhibiting activity polypeptide 1, GNAI1	ONAI!	iN
Guanine nucleotide-binding protein, alpha	GNAI2	Ν
inhibiting activity polypeptide 2, GNAI2	ONAIZ	IN
Guanine nucleotide-binding protein, alpha	GNAI3	Ν
inhibiting activity polypeptide 3, GNAI3	CIANIS	1/1
Guanine nucleotide-binding protein, alpha	GNAS1	N
stimulating activity polypeptide, GNAS1	GNAGT	17
Guanine nucleotide-binding protein, alpha	GNAS2	N
stimulating activity polypeptide, GNAS2	GIVAGE	IN
Guanine nucleotide-binding protein, alpha	GNAS3	K I
stimulating activity polypeptide, GNAS3	GIVAGG	N
Guanine nucleotide-binding protein, alpha	GNAS4	N.I
stimulating activity polypeptide, GNAS4	GIVAS4	N
Guanine nucleotide-binding protein, alpha	GNAT1	N.I
transducing activity polypeptide, GNAT1	GNATT	N
Guanine nucleotide-binding protein, alpha	GNAT2	N.I
transducing activity polypeptide, GNAT2	GNATZ	N
Guanine nucleotide-binding protein, beta	GNB3	N.
polypeptide 3	GNB3	N
Guanine nucleotide-binding protein, gamma	- GNG5	N.I
polypeptide 5	-GNG5	-·N
Guanine nucleotide-binding protein, q	GNAQ	N.I
- ', '	GNAQ	Ν
polypeptide Guanylate cyclase 2D, membrane (retina-	CUCYAD	_
· · · · · · · · · · · · · · · · · · ·	GUCY2D	Ε
specific)	CLICATA	_
Guanylate cyclase activator 1A (retina)	GUCA1A	E
Guanylate kinase	CUCAO	E
Guanylin Guanylid avalence	GUCA2	Ţ
Guanylyl cyclase	ATD4D	E
H(+), K(+) – ATPase	ATP4B	N

Heat shock protein, HSP60		1
Heat shock protein, HSP70		1
Heat shock protein, HSP90		1
Hemopexin	HPX	i
Hepatic lipase	LIPC	Ε
Histamine receptors, H1		N
Histamine receptors, H2		N
Histamine receptors, H3		N
HLH transcription factor HAND1	HAND1	G
HLH transcription factor HAND2	HAND2	G
HMG-CoA lyase	HMGCL	E
HMG-CoA reductase	HMGCR	E E E
HMG-CoA synthase	HMGCS2	E
Hormone-sensitive lipase	HSL	
HSSB, replication protein		E
Hypoxanthine-guanine	HPRT	E
phosphoribosyltransferase, HGPRT		
Ibonucleoside diphosphate reductase		E
Ikaros gene	IKAROS	G
Inosine monophosphate dehydrogenase,		. E
IMPDH	1754	_
Inosine triphosphatase	ITPA	E
Inositol monophosphatase	IMPA1	N
Insulin	INS	G
Insulin receptor	INSR	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2 receptor	IGF2R	G
Interferon alpha	IFNA1	<u> </u>
Interferon beta	IFNB	ļ.
Interferon gamma	IFNG	l
Interferon gamma receptor 1	IFNGR1	l
Interferon gamma receptor 2	IFNGR2	l i
Interferon regulatory factor 1	IRF1	
Interferon regulatory factor 4	IRF4	
Interleukin(IL) 1 receptor	IL1R	l
Interleukin(IL) 1, alpha	IL1A	!
Interleukin(IL) 1, beta	IL1B	ļ
Interleukin(IL) 10	IL10	
Interleukin(IL) 10 receptor	IL10R	
Interleukin(IL) 11	IL11	
Interleukin(IL) 11 receptor	IL11R	
Interleukin(IL) 12	IL12	
Interleukin(IL) 12 receptor, beta 1	IL12RB1	
Interleukin(IL) 13	IL13	
Interleukin(IL) 13 receptor	IL13R	
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	į.
Interleukin(IL) 2 receptor, gamma	IL2RG	

Interleukin(IL) 3	IL3	ı
Interleukin(IL) 3 receptor	IL3R	j
Interleukin(IL) 4	IL4	i
Interleukin(IL) 4 receptor	IL4R	i
Interleukin(IL) 5	IL5	į
Interleukin(IL) 5 receptor	IL5R	i
Interleukin(IL) 6	IL6	İ
Interleukin(IL) 6 receptor	IL6R	i
Interleukin(IL) 7	IL7	i
Interleukin(IL) 7 receptor	IL7R	i
Interleukin(IL) 8	IL8	i
Interleukin(IL) 8 receptor	IL8R	i
Interleukin(IL) 9	IL9	ì
Interleukin(IL) 9 receptor	IL9R	i
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	1
Kallikrein 3	KAK3	i
Kinectin	KTN1	Ğ
Kinesin, heavy chain	KNSL1	Ğ
Kinesin, light chain	KNS2	Ğ
Kininogen, High molecular weight	KNG	Ī
Leptin	LEP	Ğ
Leptin receptor	LEPR	Ğ
Leukotriene A4 hydrolase		ī
Leukotriene B4 receptor		1
Leukotriene C4 receptor		1
Leukotriene D4/E4 receptor		1
LH/choriogonadotropin (CG) receptor	LHCGR	G
LIM homeobox transcription factor 1, beta	LMX1B	G
Lipoprotein lipase	LPL	1
Lipoprotein receptor, Low Density	LDLR	Т
Lipoxygenase 12 (platelets)	LOG12	1
Lipoxygenase 5 (leukocytes)		1
Low density lipoprotein receptor-related protein	ı LRP	T
precursor		
Lysosomal acid lipase	LIPA	E
Malonyl CoA decarboxylase	•	Ε
Malonyl CoA transferase		E
Maltase-giucoamylase	and the second	~ · · E
Mannose binding protein	MBP	Ī
Mannosyl (alpha-1,6-)-glycoprotein beta-1, 2-	MGAT2	Ť
N-acetylglucosaminyltransferase		
MAPK kinase 1	MAPKK1; MEK1	G
MAPK kinase 4	MAPKK4; MEK4;	Ğ
	SERK1	•
MAPK kinase 6	MAPKK6; MEK6	G
MAPKK kinase	MAPKKK	Ğ
Matrix Gla protein	MGP	G
MEK kinase, MEKK		_

Melanocortin 2 receptor Melanocortin 4 receptor Methionine adenosyltransferase Methionine synthase	MC2R MC4R MAT1A, MAT2A MTR	. T
Methionine synthase reductase	MTRR	Ε
Methylguanine-DNA methyltransferase	MGMT	Ē
Mevalonate kinase	MVK	E
MHC Class I: Tap1	ABCR, TAP1	Ę
MHC Class II: Tap2	TAP2, PSF2	ļ
Microphthalmia-associated transcription factor	MITF	1
Mismatch repair gene, PMSL1	PMS1	G
Mismatch repair gene, PMSL2	PMS2	G G
Mitochondrial trifunctional protein, alpha	HADHA	E
subunit	HABHA	<u>_</u>
Mitochondrial trifunctional protein, beta subunit	HADHB.	Ε
Mitogen-activated protein (MAP) kinase	MAPK	G
Monoamine oxidase A	MAOA	E
Monoamine oxidase B	MAOB	E
Multidrug resistance associated protein	MRP	G
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	Ğ
•	ATP1B2	Ğ
Na+, K+ ATPase, beta 3	ATP1B3	· Ğ
Na+/H+ exchanger 1	NHE1	Ť
Na+/H+ exchanger 2	NHE2	Т
Na+/H+ exchanger 3	NHE3	Ť
Na+/H+ exchanger 4	NHE4	T
Na+/H+ exchanger 5	NHE5	Т
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	Ε
N-acetylglucosamine-6-sulfatase	GNS	E
N-acetylglucosaminidase, alpha	NAGLU	Ε
N-acetyltransferase 1	NAT1	Ε
N-acetyltransferase 2	NAT2	Ε
N-acyl hydrolase	•	1
NADH dehydrogenase (ubiquinone)	NDUFV1	Ε
flavoprotein 1		
NADH-cytochrome b5 reductase	DIA1	Ε
· · · · · · · · · · · · · · · · · · ·	POR	Ε
reductase		
Nephrolithiasis 2	NPHL2	T
Nephronophthisis 2	NPHP2	T
Nephrosis 1	NPHS1	Т
Neuroendocrine convertase 1	NEC1, PCSK1	

NKNA	N
	N
· · · · · -	N
	N
	N
2	G
NPC1	T
	1
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	0
NFATP	G
	0
NDPKA	Ε
	G
OPRD1	N
	N
	N
	E
	G
	N
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PTH	G
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PNUTL1	ī
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PEX19	T
PEX6	Ť
PEX7	T
PPARA	T
PPARG	Т
	·
PGY1	Т
PGY3	Ť
PNMT	Ė
PDNP1	G
	PXMP1 PEX1 PEX19 PEX6 PEX7 PPARA PPARG PGY1 PGY3 PNMT

pyrophosphatase 1	•	
Phosphodiesterase 1 / nucleotide	PDNP2	G
pyrophosphatase 2		_
Phosphodiesterase 1 / nucleotide	PDNP3	G
pyrophosphatase 3		•
Phospholipase A2, group 10	PLA2G10	1
Phospholipase A2, group 1B	PLA2G1B	•
Phospholipase A2, group 2A	PLA2G2A	1.
Phospholipase A2, group 2B	PLA2G2B	-
Phospholipase A2, group 4A	PLA2G4A	1 .
Phospholipase A2, group 4C	PLA2G4C	1
• • •	PLA2G4C PLA2G5	i
Phospholipase A2, group 5		l
Phospholipase A2, group 6	PLA2G6	l i
Phospholipase C alpha		- 1
Phospholipase C beta	51.054	ſ
Phospholipase C delta	PLCD1	i
Phospholipase C epsilon		İ
Phospholipase C gamma	PLCG1	1
Phosphomannomutase-2	PMM2	Т
Phosphomannose isomerase-1, PMI1	MPI	T
Phosphoribosyl pyrophosphate synthetase	PRPS1	Ε
Pituitary adenylate cyclase activating peptide	PACAP	Ν
Pituitary adenylate cyclase activating peptide	PACAP1R	Ν
receptor		
Plasminogen activator, Tissue	PLAT; TPA	Ε
Platelet-activating factor receptor	PAFR	1
Plectin 1	·PLEC1	Т
Polycystin 1	PKD1	Т
Polycystin 2	PKD2	Т
Porphobilinogen deaminase	HMBS	Ε
Potassium channel, calcium-activated,	KCNN4	Ν
Potassium channel, subfamily K, member 1	KCNK1	Ν
Potassium channel, subfamily K, member 2	KCNK2	N
Potassium channel, subfamily K, member 3	KCNK3	N
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1	N
Potassium voltage-gated channel E1	KCNE1	N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	N
POU domain, class 1, transcription factor 1	POU1F1	
(Pit1)	100111	G
` ,	DOLISEA	_
POU domain, class 3, transcription factor 4	POU3F4	G
POU domain, class 4, transcription factor 3	POU4F3	G
Pre-B-cell leukemia transcription factor 1	PBX1	G
Preproglucagon	GCG;GLP1; GLP2	G
Progesterone receptor (RU486 binding	PGR	G

rocentor		
receptor) Prolactin	001	_
	PRL	G
Prolactin receptor	PRLR	G
Proopiomelanocortin	POMC	N
Prostacyclin synthase	LIODD DODG	ı
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	I
Prostaglandin D - DP receptor		1
Prostaglandin E1 receptor		1
Prostaglandin E2 receptor		
Prostaglandin E3 receptor		1
Prostaglandin F - FP receptor		1
Prostaglandin F2 alpha receptor		. 1
Prostaglandin IP receptor		1
Prostaglandin-endoperoxidase synthase 2	PTGS2	G
Protease nexin 2	PN2	E
Protein C	PROC	I
Protein kinase DNA-activated	PRKDC	E
Protein S	PROS1	1
Pterin-4-alpha-carbinolamine	PCBD	
Purine nucleoside phosphorylase	NP	Ε·
Purinergic receptor P1A1		N
Purinergic receptor P1A2		N
Purinergic receptor P1A3		N.
Purinergic receptor P2X, 1	P2RX1	N
Purinergic receptor P2X, 2	P2RX2	N
Purinergic receptor P2X, 3	P2RX3	N
Purinergic receptor P2X, 4	P2RX4	N
Purinergic receptor P2X, 5	P2RX5	N
Purinergic receptor P2X, 6	P2RX6	N
Purinergic receptor P2X, 7	P2RX7	N
Purinergic receptor P2Y, 1	P2RY1	N
Purinergic receptor P2Y, 11	P2RY11	N
Purinergic receptor P2Y, 2	P2RY2	N
RAD51, DNA repair protein	RAD51	G
RAD52, DNA repair protein	RAD52	G
RAD54, DNA repair protein	RAD54	G
RAD55, DNA repair protein	RAD55	G
RAD57, DNA repair protein	RAD57	G
Recombination activating gene 1	RAG1	G
Recombination activating gene 2	RAG2	G
Red cone pigment	RCP	S
Replication factor A	•	Ε
Replication factor C	RFC2	E
Retinaldehyde binding protein 1	RLBP1	T
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	Ğ
Retinoic acid receptor, gamma	RARG	Ğ
Retinoid X receptor, alpha	RXRA	Ğ
•		_

Retinoid X receptor, beta	RXRB	G
Retinoid X receptor, gamma	RXRG	Ğ
Retinol binding protein 1		T
Retinol binding protein 2		Ť
Retinol binding protein 4	RBP4	Ť
Ribonucleotide reductase, RRM		Ė
Ribosephosphate pyrophosphokinase		E
Ribosomal protein L13A	RPL13A	G
Ribosomal protein S19	RPS19	E
Ribosomal protein S4, X-linked	RPS4X	E
Ribosomal protein S6 kinase	RPS6KA3	E
Ribosomal protein S9	RPS9	G
S-adenosylmethionine decarboxylase, AMD		E
Secretin	SCT	T
Secretin receptor, SCTR	SCTR	÷
Serine hydroxymethyltransferase	SHMT	Ė
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
<u>.</u>	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Slug protein		G
Small nuclear ribonucleoprotein polypeptide N	SNRPN	s
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ň
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma	SCNN1G	N
Sodium channel, voltage gated, type IV, alpha	SCN4A	N
polypeptide		, ,
Sodium channel, voltage gated, type V, alpha	SCN5A	Ν
polypeptide		
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		
Solute carrier family 1 (amino acid transporter),	SLC1A6	Т
member 6	•	•
Solute carrier family 1 (glial high affinity	SLC1A3	Т
glutamate transporter), member 3		
Solute carrier family 1 (glutamate transporter),	SLC1A1	Т
member 1		

SLC1A2	т
SLC1A4	т
SLC10A1	Т
SLC10A2	Т
SLC12A1	Т
SLC12A2	Ť
SLC12A3	Ť
SLC14A2	Ť
SLC15A1	Ť
SLC15A2	Τ
SLC16A1	Т
SLC16A7	Т
SLC17A1	Τ
SLC17A2	Т
SLC18A3	· T
SLC19A1	Т
SLC2A1	Т
SLC2A2	Т
SLC2A3	. T
SLC2A4	Т
SLC2A5	Т
SLC20A1	T
SLC20A2	. Т
SLC20A3	T
SLC21A2	Т
SLC21A3	Т
SLC22A1	Т
SLC22A2	Т
SLC22A5	Т
SLC25A12	T
SLC3A1	Ť
	•
SLC4A1	Т
	SLC1A4 SLC10A1 SLC10A2 SLC12A1 SLC12A2 SLC12A3 SLC14A2 SLC15A1 SLC15A2 SLC16A1 SLC16A7 SLC17A1 SLC17A2 SLC17A2 SLC18A3 SLC19A1 SLC2A2 SLC2A3 SLC2A4 SLC2A2 SLC2A3 SLC2A4 SLC2A5 SLC2A1 SLC2A2 SLC2A1 SLC2A2 SLC2A1 SLC2A2 SLC2A3 SLC2A4 SLC2A5 SLC2A5 SLC2A1 SLC2A2 SLC2A5 SLC2A5 SLC2A5 SLC2A5 SLC2A1

Solute carrier family 4 (anion exchanger),	SLC4A2	Т
member 2 Solute carrier family 4 (anion exchanger),	SLC4A3	т
member 3		•
Solute carrier family 5 (sodium/glucose	SLC5A1	Т
transporter), member 1	•	
Solute carrier family 5 (sodium/glucose	SLC5A2	T
transporter), member 2		
Solute carrier family 5 (sodium/glucose	SLC5A5	T
transporter), member 5	01.0710	
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member 1		
Solute carrier family 6 (neurotransmitter	SLC6A3	T
transporter, dopamine), member 3	0. 00.0	
Solute carrier family 6 (neurotransmitter	SLC6A2	T
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	T
transporter, serotonin), member 4	0.004.40	
Solute carrier family 6, member 10	SLC6A10	Ţ
Solute carrier family 6, member 6	SLC6A6	T
Solute carrier family 6, member 8	SLC6A8	T
Solute carrier family 7(amino acid transporter),	SLC7A1	Т
member 1	0.0740	_
Solute carrier family 7(amino acid transporter), member 2	SLC7A2	T
Solute carrier family 7(amino acid transporter),	·SLC7A7	Т
member 7	32377	•
Solute carrier family 8 (sodium/calcium	SLC8A1	Т
exchanger), member 1		•
Somatostatin	SST	N
Somatostatin receptor, SSTR1	SSTR1	N
Somatostatin receptor, SSTR2	SSTR2	G
Somatostatin receptor, SSTR3	SSTR3	Ň
Somatostatin receptor, SSTR4	SSTR4	N
Somatostatin receptor, SSTR5	SSTR5	N
Sorcin	SRI	T
SOS1 guanine nucleotide exchange factor	SOS1	
Steroid 5 alpha reductase 1	SRD5A1	Ē
Steroid 5 alpha reductase 2	SRD5A2	Ē
Steroid hormone receptor responsive DNA		Ğ
elements		_
Sterol carrier protein 2	SCP2	T
Succinic semi-aldehyde dehydrogenase	ssadh	T E E G
Sucrase		Ē
Sulfonylurea receptor	SUR	G
Synaptic vesicle amine transporter	SVAT	N
Tachykinin receptor, NK1R	TACR1	N N
•		

Tachykinin receptor, NK2R	TACR2	Ν
Tachykinin receptor, NK3R	TACR3	N
Terminal deoxynucleotidyltransferase	TDT	ī
Thiopurine S-methyltransferase	TPMT	Ē
Thrombopoietin	THPO	G
Thromboxane A synthase 1	TBXAS1	Ī
Thromboxane A2	TXA2	i
Thromboxane A2 receptor	TBXA2R	i
Thymidylate synthase	TYMS	Ė
Thymopoietin	TMPO	Ğ
Thyroid hormone receptor, beta	THRB	Ğ
Thyroid-stimulating hormone receptor	TSHR	Ğ
Thyroid-stimulating hormone, alpha	TSHA	Ğ
Thyroid-stimulating hormone, beta	TSHB	Ğ
Topoisomerase I		E
Topoisomerase II		E
Transcription factor 1, hepatic	TCF1	G
Transcription factor 2, hepatic	TCF2	G
Transcription factor 3	TCF3	G
Transcription factor binding to IGHM enhancer	TFE3	G
3		
Transcription factor, TUPLE1	TUPLE1	N
Transcription termination factor, RNA	TTF1	G
polymerase 1		
Transcription termination factor, RNA	TTF2	G
polymerase 2		
· · · · · · · · · · · · · · · · · · ·	TTF3	G
polymerase 3		
Transferrin	TF	G
Transferrin receptor	TFRC	G
Transthyretin	TTR	Т
Tubulin		S
Tumour necrosis factor (TNF) receptor	TRAF1	1
associated factor 1		
Tumour necrosis factor (TNF) receptor	TRAF2	
associated factor 2		
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3		
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4		
Tumour necrosis factor (TNF) receptor	TRAF5	1
associated factor 5	•	
Tumour necrosis factor (TNF) receptor	TRAF6	1
associated factor 6	·	
Tumour necrosis factor alpha	TNFA	1
Tumour necrosis factor alpha receptor	TNFAR	1
Tumour necrosis factor beta	TNFB	1
Tumour necrosis factor beta receptor	TNFBR	1

Tumour protein p53	TP53, P53 TP63	G G
Tumour protein p63 Tumour suppresssor gene DRA	DRA	I
	DIVA	Ġ
Ubiquitin Ubiquitin activating enzyme, E1		E
Ubiquitin B	UBB	Ğ
	UBC	G
Ubiquitin C	UCHL1	G
Ubiquitin carboxyl-terminal esterase L1	UBE3A	E
Ubiquitin protein ligase E3A	OBESA	E
UDP-glucose pyrophosphorylase	ugt1d, UGT1	E
UDP-glucuronosyltransferase 1	UGT2	E
UDP-glucuronosyltransferase 2	0012	T
Uncoupling protein 1	UCP3	† T
Uncoupling protein 3	UMPK	¦.
Uridine monophosphate kinase	UMPS	i I
Uridine monophosphate synthetase	GALE	Ė
Uridinediphosphate(UDP)-galactose-4-	GALE	<u>_</u>
epimerase	VIM	1
Vimentin	VIIVI	-
Vitamin B12-binding (R) protein	VDR	G G
Vitamin D receptor	XDH	E
Xanthine dehydrogenase	XPA	E
Xeroderma pigmentosum, complementation	AFA	, =
group A	XPB	Е
Xeroderma pigmentosum, complementation	AFB	
group B	·XPC	Е
Xeroderma pigmentosum, complementation	AFC	_
group C		E
Xeroderma pigmentosum, complementation		L
group D		Ε
Xeroderma pigmentosum, complementation	·	_
group E	XPF	Ε
Xeroderma pigmentosum, complementation	Al I	- .
group F Xeroderma pigmentosum, complementation	ERCC5	Ε
	21,009	_
group G	XRCC9	G
X-ray repair gene	71.000	E
Xylitol dehydrogenase	YY1	G
YY1 transcription factor		9

2. A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim

1.

- 3. A set according to claim 1 or 2 in which a minority of said probes for listed genes are absent.
- 4. A set according to claim 1 or 2 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 5. A set according to claim 1 or 2 in which a limited number of probes are replaced by probes for non-listed genes.
- 6. A set of probes for a core group of genes according to any of claims 1 to 5 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 7. A set according to any of claims 1 to 6 consisting of probes for members of a sub-group of the core group.
- 8. A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 9. A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 10. A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 11. A set according to claim 8 or 9 in which said substrate is a semiconductor microchip.
- 12. A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 13. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 14. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 15. A medical device including a set according to any of claims 1 to 13 for use in an array for detection of differential gene expression levels.
- 16. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 1) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 1 and 3 to 13 and relating the probe hybridisation pattern to said variations.
- 17. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 2) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 2 to 13 and relating the probe interaction pattern to said variations.
- 18. Use of a set or device according to any of claims 1 to 13 for the prognosis and management of patients suffering from or at risk of adverse events.

- 19. Use of a set or device according to any of claims 1 to 13 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 20. Use of a set or device according to any of claims 1 to 13 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 20. Use of a set or device according to any of claims 1 to 13 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 21. Use of a set or device according to any of claims 1 to 13 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 22. Use of a set or device according to any of claims 1 to 13 for the development of new strategies of therapeutic intervention and in clinical trials.
- 23. Use of a set or device according to any of claims 1 to 13 for construction of and generation of algorithms for patient and healthcare management.
- 24. Use of a set or device according to any of claims 1 to 13 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 25. Use of a set or device according to any of claims 1 to 13 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 26. Use of a set or device according to any of claims 1 to 13 for predicting optimum configuration/management of thereapeutic intervention.
- 27. A method according to claim 16 or 17 in which the identification of gene variants is indicative of a higher risk of experiencing adverse events for the patient or individual.
- 28. A method for generating a model to assess whether a patient or individual or population or group is or are likely to experience adverse events, which method comprises:
- i) obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from adverse events;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the adverse events;
- iii) analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 1 to 7;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of experiencing adverse events.
- 29. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 28.
- 30. A method according to any of claims 16, 17, 28 and 29 wherein at least one step is computer-controlled.
- 31. An assay suitable for use in a method according to any of claims 16, 17, 28 and 29; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 1 to 7 in a biological sample.

- 32. A formatted assay technique (kit) for use in assessing the risk of a patient or individual experiencing adverse events; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 1 or 3 to 7 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual experiencing adverse events.
- 33. A formatted assay technique (kit) for use in assessing the risk of a patient or individual experiencing adverse events; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 2 to 7 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual experiencing adverse events.
- 34. A set of probes according to claim 1, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 35. A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to cancer; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

ONCOLOGY GENE LIST	HUGO gene symbol	Protein function
Absent in melanoma 1 gene	AIM1	G
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Activin		G
Activin A receptor, type 2B	ACVR2B	G
Activin A receptor, type 2-like kinase 1	ACVRL1	G
Adenomatous polyposis coli tumour supressor	APC	G

gene	4 D 4	_
Adenosine deaminase	ADA	E
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	N
Adenyi cyclase		N
Adenylate cyclase 1	ADCY1	· Е
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	Ε
Adenylate cyclase 4	ADCY4	E
Adenylate cyclase 5	ADCY5	E
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	Ε
Adenylate cyclase 8	ADCY8	_ E
Adenylate cyclase 9	ADCY9	E
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N
Adrenocorticotrophic hormone (ACTH)	ACTHR	G
receptor		
Albumin, ALB	ALB	Т
Alcohol dehydrogenase 3	ADH3	Ε
Aldehyde dehydrogenase 1	ALDH1	E
Aldehyde dehydrogenase 10	ALDH10	E
Aldehyde dehydrogenase 2	ALDH2	Ε
Aldehyde dehydrogenase 5	ALDH5	Ε
Aldehyde dehydrogenase 6	ALDH6	Ε
Aldehyde dehydrogenase 7	ALDH7	E
Aldosterone receptor	MLR.	G
alpha tectorin	TECTA	G
alpha1-antitrypsin	Pl	Ε
alpha-actinin 2	ACTN2	G
alpha-actinin 3	ACTN3	G
Alpha-fetoprotein	AFP	G
alpha-synuclein	SNCA	N.,
Amphiregulin	AREG	G
Amyloid beta A4 precursor protein	APP	N
Amyloid beta A4 precursor-like protein	APLP	N
Androgen receptor	AR	G
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	Ε
Angiotensin receptor 1	AGTR1	Т
Angiotensin receptor 2	AGTR2	T
Angiotensinogen	AGT	E

Annexin 1	ANX 1	
Antidiuretic hormone receptor	ADHR	Ť
Antithrombin III	AT3	Ė
AP-2, alpha	TFAP2A	G
AP-2, beta	TFAP2B	G
AP-2, gamma	TFAP2C	G
Apaf-1		S
Apoptosis antigen 1	APT1	J
Apoptosis antigen ligand 1	APT1LG1	i
Apoptosis-inducing factor	AIF	i
Apurinic endonuclease	APE	Ė
Arginine vasopressin	AVP	N
Arginosuccinate synthetase	ASS	E
Aryl hydrocarbon receptor	AHR	T
Aryl hydrocarbon receptor nuclear translocator		Ť
Asparagine synthetase	AS	Ė
Aspartate receptor	,	N
Ataxia telangiectasia complementation group [ATD. ATDC	G
Ataxia telangiectasia gene, AT	ATM	G
ATP cobalamin adenoxyltransferase		E
ATP sulphurylase	atpsk2	E
ATP-binding cassette transporter 7	ABC7	Ī
Atrial natriuretic peptide	ANP	Ġ
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	Ğ
Atrophin 1	DRPLA	G
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	G
B-cell CLL/lymphoma 1	BCL1	,
B-cell CLL/lymphoma 10	BCL10	;
B-cell CLL/lymphoma 3	BCL3	1
B-cell CLL/lymphoma 4	BCL4	i
B-cell CLL/lymphoma 5	BCL5	i
B-cell CLL/lymphoma 6	BCL6	i
B-cell CLL/lymphoma 7	BCL7	i
B-cell CLL/lymphoma 8	BCL8	i
B-cell CLL/lymphoma 9	BCL9	i
BCL2-associated X protein	BAX	Ġ
BCL2-related protein A1	BCL2A1	G
Beckwith-Wiedemann region 1A	BWR1A	G
Benzodiazepine receptor		N
beta 2 microglobulin	B2M	1
beta-endorphin receptor	= =	N
beta-synuclein	SNCB	N
Bleomycin hydrolase	BLMH	E
Bone morphogenetic protein, BMP1	BMP1	G
Bone morphogenetic protein, BMP2	BMP2	G
Bone morphogenetic protein, BMP3	BMP3	G
·	D.1111 U	G

Bone morphogenetic protein, BMP4 Bone morphogenetic protein, BMP5 Bone morphogenetic protein, BMP6 Bone morphogenetic protein, BMP7	BMP4 BMP5 BMP6 BMP7	G G G
Bone morphogenetic protein, BMP8	BMP8	G
Bradykinin receptor B1		!
Bradykinin receptor B2 Brain derived neurotrophic factor	BDNF	1
Brain derived neurotrophic factor (BDNF)	BDNFR	G G
receptor	DDIA! IX	G
Branched chain aminotransferase 1, cytosolic	BCAT1	Ε
Branched chain aminotransferase 2,	BCAT2	E
mitochondrial		_
BRCA1-associated RING domain gene 1	BARD1	G
Breakpoint cluster region	BCR	Ğ
Breast cancer 1	BRCA1	Ğ
Breast cancer 2	BRCA2	Ğ
Breast cancer, ductal, 1	BRCD1	Ğ
Breast cancer, ductal, 2	BRCD2	Ğ
Bruton agammaglobulinaemia tyrosine kinase	BTK	Ğ
C1 inhibitor		E
Cadherin E	CDH1	Ğ
Cadherin EP		Ğ
Cadherin N	CDH2	Ğ
Cadherin P	CDH3	Ğ
Calbindin 1	CALB1	Ğ
•	CALB3	Ğ
Calcitonin receptor /Calcitonin gene-related	CALCR	N
peptide receptor	J. 12011	••
Calcitonin/Calcitonin gene-related peptide	CALCA	N
alpha		••
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	N
subunit	•	
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C		
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N·
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	Ν
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	N
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3	CACNB3	N
Calcium channel, voltage-dependent, L type,	CACNA1S	N
alpha 1S subunit		
Calcium channel, voltage-dependent,	CACNG2	Ν

Neuronal, Gamma		
Calcium channel, voltage-dependent, P/Q	CACNA1A	Ν
type, alpha 1A subunit		• • •
Calcium channel, voltage-dependent, T-type	*	N
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	Ğ
Calmodulin 3	CALM3	Ğ
Calmodulin-dependant protein kinase II	CAMK2A	Ğ
Calnexin	CANX	Ğ
Carbonic anhydrase 3	CA3	E
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	E
Cardiac-specific homeobox, CSX	CSX	Ğ
Cartilage-hair hypoplasia gene	CHH	Ň
Caspase 1	CASP1	G
Caspase 10	CASP10	Ğ
Caspase 2	CASP2	Ğ
Caspase 3	CASP3	Ğ
Caspase 4	CASP4	Ğ
Caspase 5	CASP5	Ğ
Caspase 6	CASP6	G.
Caspase 7	CASP7	G
Caspase 8	CASP8	G
Caspase 9	CASP9	G
Catenin, beta	CTNNB1	G
	CD1	1
CD10	CD10	ı
CD4	CD4	i
CEA		G
Cell adhesion molecule, intercellular, ICAM	ICAM1	G
Cell adhesion molecule, leukocyte-endothelial,	LECAM1	G
LECAM (CD62)		
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	PECAM1	G
PECAM		
Cell adhesion molecule, vascular, VCAM	VCAM1	G
c-erbB1	ERBB1	G
c-erbB2	ERBB2	G
c-erbB3	ERBB3	G
c-erbB4	ERBB4	G
Ceruloplasmin precursor	CP	E
Chemokine receptor CXCR1	CXCR1	1
Chemokine receptor CXCR2	CXCR2	J
Cholecystokinin	CCK	Ν

Cholecystokinin B receptor	CCKBR	N
Ciliary neurotrophic factor (CNTF)	CNTF	G G
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	Ğ
c-kit receptor tyrosine kinase		G
Clathrin		Ť
Clusterin	CLU	G
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	s S
Collagen IV alpha 6	COL4A6	S
Colony-stimulating factor 1	CSF1	G
Colony-stimulating factor 1 receptor	CSF1R	G
Colony-stimulating factor 2	CSF2	G
Colony-stimulating factor 2 alpha receptor	CSF2RA	G
Colony-stimulating factor 2 beta receptor	CSF2RB	G
Colony-stimulating factor 3	CSF3	G
Colony-stimulating factor 3 receptor	CSF3R	G
Complement component C1 inhibitor	C1NH	1
Complement component C1qa	C1QA	1
Complement component C1qb	C1QB	1
Complement component C1qg	C1QG	I
Complement component C1r	C1R	I
Complement component C1s	C1S	i
Complement component C2	C2	1
Complement component C3	C3	' I
Complement component C4A	C4A	1
Complement component C4B	C4B	1
Complement component C5	C5	ľ
Complement component C6	C6	. !
Complement component C7	C7	
Complement component C8	C8B	
Complement component C9	C9	<u> 1</u>
Complex III	00544	E
Core-binding factor, alpha 1	CBFA1	G
Core-binding factor, alpha 2	CBFA2	G
Core-binding factor, beta	CBFB	G
Corticotrophin-releasing hormone	CRH CDUB4	T
Corticotrophin-releasing hormone receptor	CRHR1	T
c-src tyrosine kinase	CSK · ·	G
Cyclic AMP-dependent protein kinase	PKA	E
Cyclin A	CCNA	G
Cyclin B	CCNB	G
Cyclin C	CCNC	G
Cyclin D	CCND1 CCNE	G
Cyclin E	CCNE	G
Cyclin F Cyclin-dependent kinase 1	CDK1	G
Cyclin-dependent kinase 1	CDK1 CDK10	G G
Cyclin-dependent kinase 10 Cyclin-dependent kinase 2	CDK10 CDK2	G
Cyonn-dependent kindse z	CUILE	G

	•	
Cyclin-dependent kinase 3	CDK3	G
Cyclin-dependent kinase 4	CDK4	G
Cyclin-dependent kinase 5	CDK5	Ğ
Cyclin-dependent kinase 6	CDK6	Ğ
Cyclin-dependent kinase 7	CDK7	Ğ
Cyclin-dependent kinase 8	CDK8	G
Cyclin-dependent kinase 9	CDK9	G
Cyclin-dependent kinase inhibitor 1A (P21,	CDKN1A	. G
CIP1)		. •
Cyclin-dependent kinase inhibitor 1B (P27,	CDKN1B	G
KIP1)		
Cyclin-dependent kinase inhibitor 1C (P57,	CDKN1C	G
KIP2)		J
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	G
Cyclin-dependent kinase inhibitor 3	CDKN3	G
Cyclooxygenase 1	COX1	E
Cyclooxygenase 2	COX2	Ē
CYP11A1	CYP11A1	Ē
CYP11B1	CYP11B1	E
CYP11B2	CYP11B2	Ē
CYP17	CYP17	E
CYP19	CYP19	Ē
CYP1A1	CYP1A1	. E
CYP1A2	CYP1A2	Ē
CYP1B1	CYP1B1	Ē
CYP21	CYP21	E
CYP24	CYP24	Ē
CYP27	CYP27	E
CYP27B1	PDDR	E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	E
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A7	E
CYP2B6	CYP2B6	Ε
CYP2C18	CYP2C18	Ε
CYP2C19	CYP2C19	E
CYP2C8	CYP2C8	E
CYP2C9	CYP2C9	Ε
CYP2D6	CYP2D6	Ε
CYP2E1	CYP2E1	E
CYP2F1	CYP2F1	Ε
CYP2J2	CYP2J2	E
CYP3A3	CYP3A3	Ε
CYP3A4	CYP3A4	Ε
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	Ε
CYP4A11	CYP4A11	Е

CYP4B1	CYP4B1	Ε
CYP4F2	CYP4F2	Ē
CYP4F3	CYP4F3	E
CYP51	CYP51	E
CYP5A1	CYP5A1	Ē
CYP7A	CYP7A	E
CYP8	CYP8	Ē
Cystathionase	СТН	Ē
Cystathione beta synthase	CBS	Ē
Cystic fibrosis transmembrane conductance	CFTR	N
regulator, CFTR		
Cytidine deaminase	CDA	Ε
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytochrome a	31. 3	E
Cytochrome c		E
Cytochrome c oxidase, MTCO	•	E
Cytokine-suppressive antiinflammatory drug-	CSBP1	1
binding protein 1	30 <i>D</i> 1 1	•
Cytokine-suppressive antiinflammatory drug-	CSBP2	- 1
binding protein 2	9051 2	1
Defender against cell death 1	DAD1	G
Deleted in colorectal carcinoma	DCC	G
Deleted in malignant brain tumours 1	DMBT1	G
Deoxycytidine kinase DCK		E
Deoxyuridine triphosphatase; dUTPase		Ē
Desert hedgehog, dhh	•	Ğ
Dihydrofolate reductase	DHFR	Ē
Dihydrolipoyl dehydrogenase		Ē
Dihyropyrimidine dehydrogenase	DPYD	Ē
DM-Kinase	DMPK	Ē
DNA damage binding protein, DDB1	DDB1	s
DNA damage binding protein, DDB2	DDB2	Š
DNA directed polymerase, alpha	POLA	Ē
DNA glycosylases		Ē
DNA helicases		Ē
DNA Ligase 1	LIG1	Ē
DNA methyltransferase	DNMT	F
DNA polymerase 1		EEE
DNA polymerase 2		E
DNA polymerase 3	·	Ē
DNA primase		Ē
DNA-damage-inducible transcript 3	DDIT3	s
DNA-dependant RNA polymerase		Ē
DOPA decarboxylase	DDC	Ē
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	N
1	· - <u>-</u> ·	. 4

Dopamine receptors D5	DRD5	N
Dynamin	DNM1	G
Dynorphin receptor		Ν
Dysferlin	DYS, DYSF	Ε
Dyskerin	DKC1	S
EB1		G
Endoglin	ENG	S
Endothelin 1	EDN1	N
Endothelin 2	EDN2	N
Endothelin 3	EDN3	N
Endothelin converting enzyme	ECE1	N
Endothelin receptor type A	EDNRA	N
Endothelin receptor type B	EDNRB	· N
Enolase	ENO1	E
Ephrin receptor tyrosine kinase A	EPHA	Ğ
Ephrin receptor tyrosine kinase B	EPHB	Ğ
Epidermal growth factor	EGF	G
Epidermal growth factor receptor	EGFR	Ğ
Estrogen receptor	ESR	Ğ
Eukaryotic initiation translation factor	EIF4E	G
EWS RNA-binding protein	EWSR1	G
Excision repair complementation group 1	ERCC1	Ē
protein		_
Excision repair complementation group 2	ERCC2	Ε
protein		
Excision repair complementation group 2	ERCC3	E
protein		
Excision repair complementation group 4	ERCC4	E
protein		
Excision repair complementation group 6	ERCC6	E
protein	CVT4	_
Exostosin 1	EXT1	S
Exostosin 2	EXT2	S
FADH dehydrogenase		E
Fanconi anemia, complementation group C	FANCC	T
Fanconi anemia, complementation group D	FANCD	T
Fc fragment of IgG, high affinity IA, receptor for		G
Fc fragment of lgG, low affinity IIa, receptor for (CD32)	FCGR2A	G
Fc fragment of lgG, low affinity Illa, receptor for	ECGR3A	G
(CD16)	. 001.071	G
Ferrochelatase	FECH	Е
Fibrillin 1.	FBN1	Ğ
Fibroblast growth factor	FGF1	Ğ
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
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	FOL 5	_
Folic acid receptor	FOLR	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Follicular lymphoma variant translocation 1	FVT1	ł
Forkhead rhabdomyosarcoma gene	FKHR	G
Forkhead transcription factor 14	FKHL14	G
Forkhead transcription factor 7	FKHL7	G
Fucosyltransferase 2	FUT2	T
Fucosyltransferase 3	FUT3	T
G/T mismatch binding protein	GTBP, MSH6	G
GABA receptor, alpha 1	GABRA1	Ν
GABA receptor, alpha 2	GABRA2	Ν
GABA receptor, alpha 3	GABRA3	Ν
GABA receptor, alpha 4	GABRA4	Ν
GABA receptor, alpha 5	GABRA5	Ν
GABA receptor, alpha 6	GABRA6	Ν
GABA receptor, beta 1	GABRB1	Ν
GABA receptor, beta 2	GABRB2	N
GABA receptor, beta 3	GABRB3	N
GABA receptor, gamma 1	GABRG1	N
GABA receptor, gamma 2	GABRG2	N
GABA receptor, gamma 2	GABRG3	N
Gadd45 (growth arrest & DNA-damage-inducib		E
Galactosyltransferase 1	GT1	G
Galactosyltransferase, alpha 1,3	GGTA1	Ğ
Galactosyltransferase, beta 3	B3GALT	Ğ
Gastrin	GAS	Ğ
Gastrin releasing peptide	GRP	Ť
Glioma chloride ion channel, GCC		G
Glucagon receptor	GCGR	Ğ
Glucagon synthase	333.1	Ť
Glucocorticoid receptor	GRL	Ġ
	GLUR1	N
Glutamate receptor 1	GLUR2	N
Glutamate receptor 2	GLUR3	N
Glutamate receptor 3	GLUR4	N
Glutamate receptor 4	GLUR5	N
Glutamate receptor 5	GLUR6	"N
Glutamate receptor 6	GLUR7	N
Glutamate receptor 7	NMDAR1	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2B	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2D	N
Glutamate receptor, ionotropic, NMDA 2D	GSH	T
Glutathione		Ë
Glutathione S-transferase mu 1, GSTM1	GSTM1	E
Glutathione S-transferase theta 1, GSTT1	GSTT1	E
Glutathione S-transferase, GSTZ1	GSTZ1	⊏

Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	Ε
Glycerol kinase	GK	Е
Glycinamide ribonucleotide (GAR)	GART	Ē
transformylase		_
Glycine receptor, alpha	GLRA2	Ν
Glycine receptor, beta		N
Glycine transporter	GLYT	N
Glypican 3	GPC3, SDYS	G
Gonadotropin releasing hormone	GNRH	Ğ
Gonadotropin releasing hormone receptor	GNRHR	G
Growth factor receptor-bound protein 2	GRB2	G
Growth hormone 1	GH1	G
Growth hormone 2 (placental)	GH2	G
Growth hormone receptor	GHR	G
Growth hormone releasing hormone (GHRH)	GHRH	G
Growth hormone releasing hormone receptor	GHRHR	G
Growth/differentiation factor 5	GDF5	G
Growth-regulated protein precursor, GRO	GRO	ı
GTPase-activating protein, GAP	RASA1	Ġ
Guanine nucleotide-binding protein, alpha	GNAI1	N
inhibiting activity polypeptide 1, GNAI1		14
Guanine nucleotide-binding protein, alpha	GNAI2	N
inhibiting activity polypeptide 2, GNAI2	SIVAL	14
Guanine nucleotide-binding protein, alpha	GNAI3	N
inhibiting activity polypeptide 3, GNAI3	G. W. I. G	
Guanine nucleotide-binding protein, alpha	GNAS1	N
stimulating activity polypeptide, GNAS1	3,1,101	
Guanine nucleotide-binding protein, alpha	GNAS2	N
stimulating activity polypeptide, GNAS2	0.0.02	
Guanine nucleotide-binding protein, alpha	GNAS3	N
stimulating activity polypeptide, GNAS3	J. 11 (30	•
Guanine nucleotide-binding protein, alpha	GNAS4	N
stimulating activity polypeptide, GNAS4		• • • • • • • • • • • • • • • • • • • •
Guanine nucleotide-binding protein, q	GNAQ	N
polypeptide	J. 1	
Guanylate kinase		Ε
H(+), K(+) - ATPase	ATP4B	N
Hairless	HR	Ğ
Hela tumor suppression gene	HTS1	G
Heparin binding epidermal growth factor	HBEGF	G
Hepatitis B virus integration site 1	HVBS1	1
Hepatitis B virus integration site 2	HVBS6	
High mobility group protein C	HMGIC	Ġ
High mobility group protein Y	HMGIY	G
Histamine receptors, H1		N
Histamine receptors, H2		N
Histamine receptors, H3		N N
· notalinio rocoptoro, rio		1.4

HLH transcription factor HAND1	HAND1	G
HLH transcription factor HAND2	HAND2	Ğ
HMG-CoA reductase	HMGCR	E
HMG-CoA synthase	HMGCS2	Ē
Homeobox (HOX) gene A13	HOXA13	G
Homeobox 11	HOX11	G
Homeobox HB24	HLX1	G
Homogentisate 1,2 dioxygenase	HGD	E
Hormone-sensitive lipase	HSL	E
HSSB, replication protein	TISE	E
Human placental lactogen	CSH1	G
Ibonucleoside diphosphate reductase	CSITI	E
·	IKAROS	
lkaros gene	INHA	G
Inhibin, alpha		G
Inhibin, beta A	INHBA	G
Inhibin, beta B	INHBB	G
Inhibin, beta C	INHBC	G
Inositol 1,4,5-triphosphate receptor 3	ITPR3	G
Insulin	INS	G
Insulin receptor	INSR	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 3	-ITGB3	G
Integrin beta 4	ITGB4	G
Integrin beta 5	ITGB5	G
Integrin beta 6	ITGB6	G
Integrin beta 7	ITGB7	G
Integrin, alpha 1	ITGA1	G
Integrin, alpha 2	ITGA2	G
Integrin, alpha 4	ITGA4	G
Integrin, alpha 5	ITGA5	G
Integrin, alpha 6	ITGA6	G
Integrin, alpha M	ITGAM	G
interferon alpha	IFNA1	t
Interferon beta	IFNB	1
Interferon gamma	IFNG	ł
Interferon gamma receptor 1	IFNGR1	1
Interferon gamma receptor 2	IFNGR2	i
Interferon regulatory factor 1	IRF1	i
Interferon regulatory factor 4	IRF4	i
Interleukin(IL) 1 receptor	IL1R	!
Interleukin(IL) 1, alpha	IL1A	ľ
Interleukin(IL) 1, beta	IL1B	1
Interleukin(IL) 10	IL10	1
	16.10	1

Interleukin(IL) 10 receptor	IL10R	1
Interleukin(IL) 11	IL11	1
Interleukin(IL) 11 receptor	IL11R	1
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	i
Interleukin(IL) 13	IL13	Ì
Interleukin(IL) 13 receptor	IL13R	ì
Interleukin(IL) 2	IL2	Ĺ
Interleukin(IL) 2 receptor, alpha	IL2RA	i
Interleukin(IL) 2 receptor, gamma	IL2RG	Ī
Interleukin(IL) 3	IL3	1
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	ı
Interleukin(IL) 4 receptor	IL4R	1
Interleukin(IL) 5	IL5	1
Interleukin(IL) 5 receptor	IL5R	1
Interleukin(IL) 6	IL6	1
Interleukin(IL) 6 receptor	IL6R	ı
Interleukin(IL) 7	IL7	1
Interleukin(IL) 7 receptor	IL7R	1
Interleukin(IL) 8	IL8	1
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	- 1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	. 1
Janus kinase 1	JAK1	G
Janus kinase 2	JAK2	G
Janus kinase 3	JAK3	G
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
	LTBP2	G
protein 2		
Leptin	LEP	G
Leptin receptor	LEPR	G
Leukaemia inhibitory factor	LIF	G
Leukaemia inhibitory factor receptor	LIFR	G
Leukotriene A4 hydrolase		1.
Leukotriene B4 receptor		1
Leukotriene C4 receptor		1
Leukotriene D4/E4 receptor		1
LH/choriogonadotropin (CG) receptor	LHCGR	G
LIM homeobox protein 1	LHX1	G
LIM homeobox protein 2	LHX2	G
LIM homeobox protein 3	LHX3	G
LIM homeobox protein 4	LHX4	G

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Limbic associated membrane protein	LAMP	G
LIM-domain only protein 1	LMO1	G
LIM-domain only protein 2	LMO2	G
LIM-domain only protein 3	LMO3	G
LIM-domain only protein 4	LMO4	G
Lipoma-preferred partner gene	LPP	G
Lipoxygenase 12 (platelets)	LOG12	
Lipoxygenase 5 (leukocytes)	LOQ12	1
Long QT-type 2 potassium channels	LQT2, KCNH2	 -
Lowe oculocerbrorenal syndrome gene	OCRL	Ţ
Luteinizing hormone-releasing hormone	OURL	E
Luteinizing hormone-releasing hormone		N
receptor		N
Lymphoblastic leukemia derived sequence 1	LYL1	
Lymphocyte-specific protein tyrosine kinase	LCK	!
	LEF-1	1
Lymphoid enhancer-binding factor		G
Macrophage activating factor	MAF	1
MAD (mothers against decapentaplegic,	MADH3	G
Drosophila) homologue 3	MADULA	_
MAD (mothers against decapentaplegic,	MADH4	G
Drosophila) homologue 4	· MEEOA	_
MADS box transcription-enhancer factor 2A	MEF2A	G
MADS box transcription-enhancer factor 2B	MEF2B	G
MADS box transcription-enhancer factor 2C	MEF2C	G
MADS box transcription-enhancer factor 2D	MEF2D	G
Malignant proliferation, eosinophil gene	MPE	1
MAPK kinase 1	MAPKK1; MEK1	G
MAPK kinase 4	MAPKK4; MEK4;	G
MARKE	SERK1	_
MAPK kinase 6	MAPKK6; MEK6	. G
MAPKK kinase	MAPKKK	G
MAX-interacting protein 1	MXI1	G
MEK kinase, MEKK		E
Melanocortin 1 receptor	MC1R	Т
Menin	MEN1	G
Methionine adenosyltransferase	MAT1A, MAT2A	E
Methionine synthase	MTR	, E
Methionine synthase reductase	MTRR	Ε
Methylguanine-DNA methyltransferase	MGMT	E
MHC Class I: A		l
MHC Class I: B		1
MHC Class I: C		J
MHC Class I: LMP-2, LMP-7		i
MHC Class I: Tap1	ABCR, TAP1	1
MHC Class II: DP	HLA-DPB1	ł
MHC Class II: DQ		1
MHC Class II: DR		1
MHC Class II: Tap2	TAP2, PSF2	1
	•	

MHC Class II:Complementation group B MHC Class II:Complementation group C MHC Class II:Complementation group D Midline 1 Mismatch repair gene, PMSL1 Mismatch repair gene, PMSL2 Mitogen-activated protein (MAP) kinase Motilin Msh homeobox homolog 1 Msh homeobox homolog 2 Mucin 18 Muscarinic receptor, M1 Muscarinic receptor, M2 Muscarinic receptor, M3 Muscarinic receptor, M4 Muscarinic receptor, M5 Mutated in colorectal cancers, MCC MutL homolog 1 MutS homolog 2 MutS homolog 3 Myelin protein peripheral 22 Myelodysplasia syndrome 1 gene Myeloid leukemia factor-1 N-acetyltransferase 1	MHC2TA rfxank RFX5 RFXAP MID1 PMS1 PMS2 MAPK MLN MSX1 MSX2 MUC18 CHRM1 CHRM2 CHRM3 CHRM4 CHRM5 MCC MLH1 MSH2 MSH3 PMP22 MDS1 MLF1 NAT1	GGGGGGGTZZZZZGGGGGGG
N-acetyltransferase 2 NADPH-dependent cytochrome P450	NAT2 POR	Ē E
reductase		_
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neuregulin Neurexin	HGL	G N
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	Ğ
Neurokinin A	NKNA	N
Neurokinin B	NKNB	Ν
Neuronal apoptosis inhibitory protein	NAIP	1
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	Ν
Neuropeptide Y receptor Y2	NPY2R	N ·
Neurotensin	NTS	Ν
Neurotensin receptor	NTSR1	N
Neurotrophic tyrosine kinase receptor 1	NTRK1	G
Neutral endopeptidase		E
Niacin receptor Nodal	NODAL	G
	NODAL	G
Norrie disease protein	NDP	G
Notch 3	NOTCH3	G

	•	•
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor kappa beta	NFKB	1
Nuclear factor of activated T cells (NFAT)	NFATC	G
complex, cytosolic		
Nuclear factor of activated T cells (NFAT)	NFATP	G
complex, preexisting component		
Nuclear mitotic apparatus protein 1	NUMA1	G
Nucleophosmin	NPM1	Т
Oligophrenin-1	OPHN1	G
Oncogene abi1	ABL1	G
Oncogene abl2		G
Oncogene akt1		G
Oncogene akt2	AKT2	G
Oncogene axl	AXL	G
Oncogene bcl2		G
Oncogene bcr/abl		Ğ
Oncogene B-lym		Ğ
Oncogene B-raf		G
Oncogene clk1		Ğ
Oncogene c-myc		G
Oncogene cot		Ğ
Oncogene crk		Ğ
Oncogene crkl		Ğ
Oncogene ect2		Ğ
Oncogene ELK1	ELK1	Ğ
Oncogene ELK2	ELK2	Ğ
Oncogene ems1		Ğ
Oncogene ERB		Ğ
Oncogene ERB2		G
Oncogene ERBA		G
Oncogene ERBAL2		G
Oncogene ERG (early reponse gene)		G
Oncogene ETS1		G
Oncogene ETS2		G
Oncogene EVI1	EVI1	G
Oncogene fes		G
Oncogene fgr		· G
Oncogene fos	FOS	G
Oncogene fps		G
Oncogene GLI1	GLI	G
Oncogene GLI2	GLi2	Ğ
Oncogene GLi3	GLI3	Ğ
Oncogene gro1		Ğ
Oncogene gro2		Ğ
Oncogene Ha-ras	HRAS	G
Oncogene hs1	-	G
Oncogene hst	FGF4	G
Oncogene int1	WNT1	G
~		9

Oncogene int2	FGF3	G
Oncogene int3	Notch4	G
Oncogene int4	WNT3	G
Oncogene jun	JUN	G
Oncogene KIT	KIT, PBT	G
Oncogene LCO	LCO	G
Oncogene I-myc		G
Oncogene Ipsa		Ğ
Oncogene lyn		G
Oncogene maf		G
Oncogene mas1	×.,,	G
Oncogene mcf2		G
Oncogene mdm2		G
Oncogene mel		G
Oncogene met		G
Oncogene mos		G
Oncogene mpl		Ğ
Oncogene MUM1		G
Oncogene myb		G
Oncogene myc		G
Oncogene n-myc		G
Oncogene N-ras (neuroblastoma v-ras)		G
Oncogene ovc		G
Oncogene pim1	•	G
Oncogene pti-1sea		G
Oncogene pvt1		G
Oncogene raf -	RAF	G
Oncogene ralb		G
Oncogene rel		G
Oncogene ret	RET .	G
Oncogene r-myc	,	G
Oncogene ros		G
Oncogene R-ras		G
Oncogene sis	PDGFB	G
Oncogene ski	•	G
Oncogene sno	•	G
Oncogene spi1		G
Oncogene src	•	G
Oncogene tc21	•	G
Oncogene TEL	ETV6	G
Oncogene tim		G
Oncogene vavtrk	•	G
Oncogene v-Ki-ras2	KRAS2	G
Oncogene yes	•	G
Oncogene yuasa		G
Oncostatin M	OSM	G
Oncostatin M receptor	OSMR	G
Opioid receptor, delta	OPRD1	Ν

•	•	
Opioid receptor, kappa	OPRK1	Ν
Opioid receptor, mu	OPRM1	Ν
Orexin	OX	G
Osteopontin	OPN	G
Oxytocin	OXT	Ν
Oxytocin receptor	OXTR	Ν
Paired box homeotic gene 3	PAX3	G
Paired box homeotic gene 6	PAX6	G
Paired box homeotic gene 7	PAX7	Ğ
Paired-like homeodomain transcription factor 2	PITX2	Ğ
Paired-like homeodomain transcription factor 3		Ğ
Parathyroid hormone	PTH	Ğ
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	G
Parvalbumin	PVALB	G
Patched (Drosophila) homolog, PTCH	PTCH	G
PCNA (proliferating cell nuclear antigen)	1 1011	E
Peanut-like 1	PNUTL1	ī
Peroxisome proliferative activated receptor,	PPARA	Ť
alpha	T AIVA	,
Peroxisome proliferative activated receptor,	PPARG	Т
gamma	TARO	•
P-glycoprotein 1	PGY1	Т
P-glycoprotein 3	PGY3	Ť
Phenylalanine hydroxylase	PAH	Ė
Phosphatase & tensin homolog	PTEN	G
	PIGA	G
(paroxysmal noctumal hemoglobinuria)	TIOA	G
Phospholipase A2, group 10	PLA2G10	,
Phospholipase A2, group 1B	PLA2G1B	1
Phospholipase A2, group 2A	PLA2G2A	1
Phospholipase A2, group 2B	PLA2G2B	1
Phospholipase A2, group 4A	PLA2G4A	1
Phospholipase A2, group 4C	PLA2G4A	1.
• • • • • • • • • • • • • • • • • • • •		1
Phospholipase A2, group 5	PLA2G5 PLA2G6	1
Phospholipase A2, group 6	PLAZGO	1
Phospholipase C epsilon	DAARAA	1
Phosphomannomutase 1	PMM1	G
Phosphomannomutase 2	PMM2	G
Plasminogen	PLG	E
Plasminogen activator inhibitor 1	PAI1	E
Plasminogen activator inhibitor 2	PAI2	E
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	E
Plasminogen activator, Urokinase	UPA; PLAU	E
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Platelet glycoprotein 1b, beta	GP1BB	1

Platelet glycoprotein 1b, gamma	GP1BG	1
Platelet glycoprotein IX	GP9	i
Platelet glycoprotein V	GP5	. 1
Potassium inwardly-rectifying channel J1	KCNJ1	Ņ
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1	
Potassium voltage-gated channel E1	KCNE1	N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	N
POU domain, class 1, transcription factor 1	POU1F1	N
(Pit1)	FOOTET	G
POU domain, class 3, transcription factor 4	DOU2E4	_
POU domain, class 4, transcription factor 3	POU3F4	G
Pre-B-cell leukemia transcription factor 1	POU4F3	G
Preproglucagon	PBX1	G
· •	GCG;GLP1; GLP2	G
Preproglucagon	DOME	Т
Prion protein	PRNP	N
Prodynorphin		N
Progesterone receptor (RU486 binding	PGR	G
receptor)	5.15	
Prohibitin	PHB	G
Prolactin	PRL	G
Prolactin receptor	PRLR	G
Prolactin releasing hormone	PRH	G
Proliferin	PLF	G
Promyelocytic-leukemia gene	PML	G
Proopiomelanocortin	POMC	Ν
Prophet of Pit1	PROP1	G
Prostacyclin synthase		1
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	ı
Prostaglandin D - DP receptor		1.
Prostaglandin E1 receptor		1
Prostaglandin E2 receptor		1
Prostaglandin E3 receptor		1
Prostaglandin F - FP receptor		1
Prostaglandin IP receptor		t
Prostate cancer anti-metastasis gene KAI1	KAI1	G
Protein kinase B	PRKB	
Protein kinase C, alpha	PRKCA	Ε
Protein phosphatase 2, regulatory subunit A,	PPP2R1B	E
beta isoform		_
Protein tyrosine phosphatase, non-receptor	PTPN12	G
type 12		•
Purine nucleoside phosphorylase	NP	Ε
Purinergic receptor P1A1		N
Purinergic receptor P1A2	•	N
Purinergic receptor P1A3		N
		1.4

Purinergic receptor P2X, 1	P2RX1	N
Purinergic receptor P2X, 2	P2RX2	N
Purinergic receptor P2X, 3	P2RX3	N
Purinergic receptor P2X, 4	P2RX4	N
Purinergic receptor P2X, 5	P2RX5	N
Purinergic receptor P2X, 6	P2RX6	N
Purinergic receptor P2X, 7	P2RX7	N
Purinergic receptor P2Y, 1	P2RY1	N
Purinergic receptor P2Y, 11	P2RY11	N
Purinergic receptor P2Y, 2	P2RY2	N
Rabphilin	, 4, 1, 14	N
RAD51, DNA repair protein	RAD51	G
RAD52, DNA repair protein	RAD52	G
RAD54, DNA repair protein	RAD54	
RAD55, DNA repair protein	RAD55	G
RAD57, DNA repair protein	RAD57	G
RAS-associated protein, RAB3A	RAB3A	G
Ras-G-protein	RAS .	N
Receptor tyrosine kinase (RTK), Nsk2	NSK2	G
Relaxin H1	RLN1	G
Relaxin H2	RLN2	G
	RLINZ	G
Replication factor A	BEC2	E
Replication factor C	RFC2	E
Retinoblastoma 1	RB1	G
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoschisis, X-linked, juvenile	RS	G
Rhabdoid tumors	SMARCB1	G
Ribonucleotide reductase, RRM	DDI 40.4	Ε
Ribosomal protein L13A	RPL13A	G
Ribosomal protein L17	RPL17	G
Ribosomal protein S6 kinase	RPS6KA3	E
RIGUI	RIGUI	G
Rim		N
Ryanodine receptor 1, skeletal	RYR1	G
S-adenosylmethionine decarboxylase, AMD		E
SAP (SLAM-associated protein)	SH2D1A	1
Secretin	SCT	T
Secretin receptor, SCTR	SCTR	Т
Serine hydroxymethyltransferase	SHMT	Ε
Serine/threonine kinase 11	STK11	G
Serine/threonine kinase 2	STK2	G
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν

Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Signal transducer and activator of transcription		N
1	SIAII	G
Signal transducer and activator of transcription	CTATO	_
2	SIAIZ	G
	CTATO	_
Signal transducer and activator of transcription	SIAI3	G
Signal transducer and activates of the same		
Signal transducer and activator of transcription	SIAI4	G
Giornal Association and a stitute of the sta	CT.	
Signal transducer and activator of transcription	STAT5	G
5		
Signaling lymphocyte activation molecule	SLAM	1
Sine oculis homeobox, drosophila, homolog 1	SIX1	G
Sine oculis homeobox, drosophila, homolog 2	SIX2	G
Sine oculis homeobox, drosophila, homolog 5	SIX5	G
Small nuclear ribonucleoprotein polypeptide N	SNRPN	S
Smoothened (Drosophila) homolog	SMOH	G
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	Ν
Sodium channel, non-voltage gated 1, gamma	SCNN1G	N
Sodium channel, voltage gated, type V, alpha	SCN5A	N
polypeptide		
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		• •
• • •	SLC1A1	Т
member 1		•
Solute carrier family 1 (glutamate transporter),	SLC1A2	Т
member 2	020 17 L2	ı
Solute carrier family 12, member 1	SLC12A1	Т
	SLC12A2	†
Solute carrier family 12, member 3	SLC12A3	
Solute carrier family 19 (folate transporter),	SLC19A1	T
member 1	SLC19A1	T
Solute carrier family 25, member 12	CL COEAAO	_
	SLC25A12	T
Solute carrier family 5 (sodium/glucose	SLC5A1	T
transporter), member 1	01.0540	_
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2	0.000	
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5		

Solute carrier family 5, member 3	SLC5A3	_
Solute carrier family 6 (GAMMA-	SLC6A1	Ţ
· · · · · · · · · · · · · · · · · · ·		T
AMINOBUTYRIC ACID transporter), member 1		
Solute carrier family 6 (neurotransmitter	SLC6A3	T
transporter, dopamine), member 3	0.00.0	
Solute carrier family 6 (neurotransmitter	SLC6A2	T
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	Ţ
transporter, serotonin), member 4		
Somatostatin	SST	Ν
Somatostatin receptor, SSTR1	SSTR1	Ν
Somatostatin receptor, SSTR2	SSTR2	G
Somatostatin receptor, SSTR3	SSTR3	Ν
Somatostatin receptor, SSTR4	SSTR4	Ν
Somatostatin receptor, SSTR5	SSTR5	Ν
Sorcin	SRI	Т
SOS1 guanine nucleotide exchange factor	SOS1	Ġ
SRY-box 11	SOX11	Ğ
Stem cell factor	SCF	Ğ
Steroid hormone receptor responsive DNA		G
elements	·	
Steroidogenic acute regulatory protein	STAR	Т
Substance P		N
Sulfonylurea receptor	SUR	G
Suppression of tumorigenicity 3 gene	ST3	G
Suppression of tumorigenicity 8 gene	ST8	Ğ
Surfeit 1	SURF1	G
Synapsin 1a & 1b	SYN1	N
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle protein 2	SV2	N
Synaptobrevin 1	SYB1	N
Synaptobrevin 2	SYB2	N
Synaptogyrin	3162	N
Synaptophysin	SYP	
Synaptosomal-associated protein, 25KD	SNAP25	N
· ·	SYT1	N
• •	SYT2	N
Synaptotagmin 2	SYND1	N
Syndecan 1		G
Syndecan 2	SYND2	G
Syndecan 3	SYND3	G
Syndecan 4	SYND4	G
Synovial sarcoma gene 1	SSX1	G
Synovial sarcoma gene 2	SSX2	G
Syntaxin 1	STX1	N
Tachykinin receptor, NK1R	TACR1	Ν
Tachykinin receptor, NK2R	TACR2	Ν
Tachykinin receptor, NK3R	TACR3	N
Talin	TLN	G

Talin, TLN		S
T-cell acute lymphocytic leukemia 1	TAL1	- 1
T-cell acute lymphocytic leukemia 2	TAL2	Ī
T-cell receptor, alpha	TCRA	İ
T-cell receptor, delta	TCRD	i
Telomerase protein component		Ė
Tenascin (cytotactin)		S
Tenascin XA	TNXA	S
Terminal deoxynucleotidyltransferase, TDT	11001	
Testis-specific protein Y	TSPY	E
Thrombopoietin	THPO	G
•		G
Thromboxane A synthase 1 Thromboxane A2	TBXAS1	- !
	TXA2	- 1
Thromboxane A2 receptor	TBXA2R	1
Thy-1 T-cell antigen	THY1	i
Thymidylate synthase	TYMS	Ε
Thymopoietin	TMPO	G
Thymosin		- 1
Thyroid-stimulating hormone receptor	TSHR	G
Thyroid-stimulating hormone, alpha	TSHA	G
Thyroid-stimulating hormone, beta	TSHB	G
Thyrotropin releasing hormone	TRH	Ν
Thyrotropin releasing hormone	TRH	G
Thyrotropin releasing hormone receptor	TRHR	Ν
Tip-associated protein	TAP	Ī
Tissue inhibitor of metalloproteinase 1, TIMP1	TIMP1	Ė
Tissue inhibitor of metalloproteinase 2, TIMP2		Ē
Tissue inhibitor of metalloproteinase 3, TIMP3	TIMP3	E
Tissue inhibitor of metalloproteinase 4, TIMP4	TIMP4	E
Topoisomerase II	******	E
Transacylase		E
Transcobalamin 1, TCN1		T
Transcobalamin 2, TCN2	TCN2	
Transcription factor 1, hepatic	TCF1	T
		G
Transcription factor 2, hepatic	TCF2	G
Transcription factor 3	TCF3	G
Transcription factor binding to IGHM enhancer	TFE3	G
3		• •
Transcription termination factor, RNA	TTF1	G
polymerase 1		
Transcription termination factor, RNA	TTF2	G
polymerase 2		
Transcription termination factor, RNA	TTF3	G
polymerase 3		
Transferrin	TF	G
Transferrin receptor	TFRC	Ğ
Transforming growth factor, alpha	TGFA	Ğ
Transforming growth factor, beta 2	TGFB2	G
	. 0. 02	J

Transforming growth factor, beta induced Transforming growth factor, beta receptor 2	TGFBI TGFBR2	G G
Translocation in renal carcinoma on chromosome 8 gene	TRC8	G
Tuberous sclerosis 1	TSC1	G
Tuberous sclerosis 2	TSC2	G
Tubulin		S
Tumor susceptibility gene 101	TSG101	G
Tumour necrosis factor (TNF) receptor	TRAF1	Ī
associated factor 1	s	•
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		
Tumour necrosis factor (TNF) receptor	TRAF3	. 1
associated factor 3		
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4		
Tumour necrosis factor (TNF) receptor	TRAF5	i.
associated factor 5		
Tumour necrosis factor (TNF) receptor	TRAF6	1
associated factor 6		
Tumour necrosis factor alpha	TNFA	I
Tumour necrosis factor alpha receptor	TNFAR	. 1
Tumour necrosis factor beta	TNFB	i
Tumour necrosis factor beta receptor	TNFBR	ı
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tumour protein p73	TP73	G
Tumour protein, translationally-controlled 1	TPT1	G
Tumour suppresssor gene DRA	DRA	1
Twist (Drosophila) homolog	TWIST	G
Ubiquitin		G
Ubiquitin activating enzyme, E1		E
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
Ubiquitin fusion degeneration 1-like	UFD1L	G
Ubiquitin protein ligase E3A	UBE3A	E
Vacuolar proton pump, subunit 1	VPP1	· N
Vacuolar proton pump, subunit 3	VPP3	N
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	N
Vitamin B12-binding (R) protein		G
Vitamin D receptor	VDR	G
v-myc avian myelocytomatosis viral oncogene	MYC	G
homolog		
Von Hippel-Lindau gene	VHL	G
Werner syndrome helicase	WRN	G
Wilms tumour gene 1	WT1	G
Wilms tumour gene 2	WT2	G

Wilms tumour gene 4 Winged helix nude Wiskott-Aldrich syndrome protein Xeroderma pigmentosum, complementation	WT4 WHN WASP, THC XPB	G G I E
group B	VDO	_
Xeroderma pigmentosum, complementation group C	XPC	E
Xeroderma pigmentosum, complementation group D		E
Xeroderma pigmentosum, complementation group E		E
Xeroderma pigmentosum, complementation group F	XPF	E
Xeroderma pigmentosum, complementation group G	ERCC5	Ε
X-ray repair gene YY1 transcription factor Zinc finger protein 198 Zinc finger protein HRX	XRCC9 YY1 ZIC198 ALL1	G G S I

- 36. A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 35.
- 37. A set according to claim 35 or 36 in which a minority of said probes for listed genes are absent.
- 38. A set according to claim 35 or 36 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 39. A set according to claim 35 or 36 in which a limited number of probes are replaced by probes for non-listed genes.
- 40. A set of probes for a core group of genes according to any of claims 35 to 39 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 41. A set according to any of claims 35 to 40 consisting of probes for members of a sub-group of the core group.
- 42. A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.

- 43. A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 44. A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 45. A set according to claim 42 or 43 in which said substrate is a semiconductor microchip.
- 46. A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 47. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 48. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 49. A medical device including a set according to any of claims 35 to 47 for use in an array for detection of differential gene expression levels.
- 50. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 35) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 35 and 37 to 47 and relating the probe hybridisation pattern to said variations.
- 51. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 36) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 36 to 47 and relating the probe interaction pattern to said variations.
- 52. Use of a set or device according to any of claims 35 to 47 for the prognosis and management of patients suffering from or at risk of developing symptoms and consequences of cancer.
- 53. Use of a set or device according to any of claims 35 to 47 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 54. Use of a set or device according to any of claims 35 to 47 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 55. Use of a set or device according to any of claims 35 to 47 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 56. Use of a set or device according to any of claims 35 to 47 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 57. Use of a set or device according to any of claims 35 to 47 for the development of new strategies of therapeutic intervention and in clinical trials.
- 58. Use of a set or device according to any of claims 35 to 47 for construction of and generation of algorithms for patient and healthcare management.
- 59. Use of a set or device according to any of claims 35 to 47 for modelling or assessing the impact of diseases or healthcare management strategies on

- individuals, groups, patient cohorts or populations
- 60. Use of a set or device according to any of claims 35 to 47 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 61. Use of a set or device according to any of claims 35 to 47 for predicting optimum configuration/management of thereapeutic intervention.
- 62. A method according to claim 50 or 51 in which the identification of gene variants is indicative of a higher risk of developing symptoms and consequences of cancer for the patient or individual.
- 63. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop symptoms and consequences of cancer which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from cancer;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the cancer;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 35 to 41;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing symptoms and consequences of cancer.
- 64. A method for assessing whether a given subject will be at risk of developing symptoms and consequences of cancer, which comprises comparing said subject's genotype with a model generated by the method of claim 63.
- 65. A method according to any of claims 50, 51, 63 and 64 wherein at least one step is computer-controlled.
- 66. An assay suitable for use in a method according to any of claims 50, 51, 63 and 64; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 35 to 41 in a biological sample.
- 67. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing symptoms and consequences of cancer; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 35 or 37 to 41 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing symptoms and consequences of cancer.
- 68. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing symptoms and consequences of cancer; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core

- group of genes as defined in any of claims 36 to 41 in an expressed-protein-containing human sample;
- ii) reagents for use in the detection process
- readout indicating the probability of a patient or individual developing symptoms and consequences of cancer.
- 69. A set of probes according to claim 35, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 70. A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to CNS dysfunction, damage or disease; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

CNS GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	Ε
2,3-bisphosphoglycerate mutase	BPGM	E
2,4-dienoyl CoA reductase	DECR	E,
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	E
3-oxoacid CoA transferase	OXCT	E
4-hydroxyphenylpyruvate dioxygenase	HPD	E
5,10-methylenetetrahydrofolate reductase	MTHFR	E
(NADPH)		
6-pyruvoyltetrahydropterin synthase	PTS	Ε
Acetoacetyl 2-CoA-thiolase	ACAT2	E
Acetyl CoA acyltransferase	ACAA	E
Acetyl CoA carboxylase alpha	ACACA	E
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	Ν
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	. N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N ·

Acetylcholine receptor, nicotinic, beta 3 Acetylcholine receptor, nicotinic, beta 4 Acetylcholine receptor, nicotinic, epsilon Acetylcholine receptor, nicotinic, gamma Acetylcholinesterase Acyl CoA dehydrogenase, long chain Acyl CoA dehydrogenase, medium chain Acyl CoA dehydrogenase, short chain Acyl-CoA thioesterase Adaptin, beta 3A Adducin, alpha Adducin, beta Adenosine monophosphate deaminase Adenosine receptor A1 Adenosine receptor A2A Adenosine receptor A2B Adenosine receptor A3 Adenyl cyclase Adenylate cyclase 1 Adenylate cyclase 2 Adenylate cyclase 3 Adenylate cyclase 4 Adenylate cyclase 5 Adenylate cyclase 5 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 9 Adenylate cyclase 9 Adenylate cyclase 9 Adenylate cyclase 9 Adenylate cyclase 9 Adenylate cyclase 9 Adenylate cyclase 9 Adenylosuccinate lyase Adrenergic receptor, alpha1 Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3	CHRNB3 CHRNB4 CHRNG ACHE ACADL ACADM ACADS ADTB3A ADD1 ADD2 AMPD ADORA1 ADORA2A ADORA2B ADORA3 ADCY1 ADCY2 ADCY3 ADCY2 ADCY3 ADCY4 ADCY5 ADCY6 ADCY7 ADCY8 ADCY7 ADCY8 ADCY7 ADCY8 ADCY9 ADSL ADRA1 ADRA2 ADRA1 ADRA2 ADRB1 ADRB2 ADRB3	ZZZZEEEEEEEZZZZEEEEEEEEZZZZZEEEEEEEEEE
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	G
Adrenoleukodystrophy gene	ALD	E
Aldohyda dahydaganaa 10	ALB	Ţ
Aldehyde dehydrogenase 10 Aldolase A	ALDH10 ALDOA	E
Aldolase B	ALDOB	E E
Aldolase C	ALDOC	E
Aldosterone receptor	MLR	G
Alpha 2 macroglobulin	A2M	J
alpha tectorin	TECTA	Ġ
alpha thalassemia gene	ATRX	N
alpha1-antitrypsin	PI	Ë
alpha2-antiplasmin	PLI	Ē
alpha-Galactosidase A	GLA	E
•		-

alpha-ketoglutarate dehydrogenase alpha-L-Iduronidase alpha-synuclein Aminomethyltransferase Aminopeptidase P Amylo-1,6-glucosidase Amyloid beta (A4) precursor protein-binding, APBB1	IDUA SNCA AMT XPNPEP2 AGL APBB1	N N N N N N N N N N N N N N N N N N N
Apolipoprotein D Apolipoprotein E Apolipoprotein H Archaete-scute homolog 2 Arginase Arginine vasopressin Arginosuccinate lyase Arginosuccinate synthetase Arylsulfatase A Arylsulfatase B Arylsulfatase D Arylsulfatase E Arylsulfatase F Aspartoacylase Aspartylglucosaminidase Astrotactin Ataxia telangiectasia complementation group D	APP APLP ANGPT1 ANGPT2 ACE, DCP1 AGTR1 AGTR2 AGT ADHR AT3 APOA1 APOA2 APOB APOC1 APOC2 APOC3 APOD APOE APOH ASH2 ARG1 AVP ASL ASS ARSA ARSB ARSD ARSE ARSPA AGA ASTN ATD, ATDC	NNGGETTETETTTTTTTGENEEEEEEGG
Ataxia telangiectasia gene, AT ATP-binding cassette transporter 7 Atrial natriuretic peptide Atrial natriuretic peptide receptor A Atrial natriuretic peptide receptor B Atrial natriuretic peptide receptor C	ATM ABC7 ANP NPR1 NPR2 NPR3	G

Bagpipe homeobox, drosophila homolog of, beta-Glucuronidase	GUSB	G E
beta-synuclein	SNCB	N
Bilirubin UDP-glucuronosyltransferase	51.14	E
Bloom syndrome protein	BLM .	G
Bradykinin receptor B1		İ
Bradykinin receptor B2		
Brain derived neurotrophic factor	BDNF	G
Brain derived neurotrophic factor (BDNF)	BDNFR	G
receptor	DOUE ::	
Butyrylcholinesterase	BCHE "	, E
Ca(2+) transporting ATPase, slow twitch Cadherin E	ATP2A2	T
Cadhein EP	CDH1	G
	00110	G
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	
Calcineurin A2	CALNA2	. 1
Calcineurin A3	CALNA3	1
Calcineurin B		1
Calcitonin/Calcitonin gene-related peptide	CALCA	N
alpha		
Calcium channel, voltage-dependent, alpha	CACNA1F	N
1F subunit		
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		.,
Calcium channel, voltage-dependent, Alpha-	CACNA1C	N
1C		.,
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)		• •
Calcium channel, voltage-dependent, Alpha-	CACNA2	N.
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNR1	N
Calcium channel, voltage-dependent, Beta 3		· N
Calcium channel, voltage-dependent, L type,	CACNA1S	N
alpha 1S subunit	OACIVATO	14
Calcium channel, voltage-dependent,	CACNG2	N
Neuronal, Gamma	CACINGZ	N
Calcium channel, voltage-dependent, P/Q	CACNIATA	
type, alpha 1A subunit	CACNA1A	N
Calcium channel, voltage-dependent, T-type Calmodulin 1	CALAG	N
	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G

Calmodulin-dependant protein kinase II	CAMK2A	G
Calnexin	CANX	G
Calpain	CAPN, CAPN3	Ε
Calretinin	CALB2	N
Cannabinoid receptor	CNR1	N
•	CA3	
Carbonic anhydrase 3		E
Carbonic anhydrase 4	CA4	· E
Carbonic anhydrase, alpha	CA1	Ε
Carbonic anhydrase, beta	CA2	Ε
Cardiac-specific homeobox, CSX	CSX	G
Carnitine acetyltransferase	CRAT	Ε
Carnitine acylcarnitine translocase	CACT	E
Carnitine transporter protein	CDSP, SCD	Ŧ
Carnosinase	020, , 000	Ń
Caspase 1	CASP1	G
	COMT	E
Catechol-O-methyltransferase		
CD1	CD1	!
CD4	CD4	1
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Ceroid lipofuscinosis neuronal 2	CLN2	Ν
Ceroid lipofuscinosis neuronal 3	CLN3	Ν
Ceroid lipofuscinosis neuronal 4	CLN4	Ν
Ceroid lipofuscinosis neuronal 5	CLN5	N
Ceroid lipofuscinosis neuronal 6	CLN6	Ν
Chemokine receptor CCR2	CCR2	1
Chemokine receptor CCR3	CCR3	i
Chemokine receptor CCR5	CCR5	i
Chemokine receptor CXCR4	CXCR4	i
Chloride channel 1, skeletal muscle	CLCN1	s
Cholecystokinin	CCK	N
•	CCKBR	
Cholecystokinin B receptor		N
Choline acetyltransferase	CHAT	E
Choroideremia gene	CHM	S
Chromogranin A	CHGA	G
Chymotrypsinogen	_	. E
Ciliary neurotrophic factor (CNTF)	CNTF	G
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	G
Clathrin		Т
CoA transferase		Ε
Cochlin	COCH	1
Cockayne syndrome gene, CKN1	CKN1	G
Cofilin		S
Collagen I aipha 1	COL1A1	S
Collagen I alpha 2	COL1A2	S
Collagen II alpha 1	COL2A1	S
· · · · · · · · · · · · · · · · · · ·	COL3A1	S
Collagen III alpha 1	COLOAT	3

Collagen IV alpha 1 Collagen IV alpha 2 Collagen IV alpha 3 Collagen IV alpha 4 Collagen IV alpha 5 Collagen IV alpha 6 Collagen IX alpha 2 Collagen IX alpha 3 Collagen receptor Collagen V alpha 1 Collagen V alpha 1 Collagen VI alpha 2 Collagen VI alpha 2 Collagen VI alpha 3 Collagen VI alpha 1 Collagen VI alpha 3 Collagen VI alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X alpha 1 Collagen X I alpha 2 Collagen XI alpha 1 Collagen XI alpha 1 Collagen XII alpha 1 Collagenic-like tail subunit of asymmetric acetylcholinesterase	COL4A1 COL4A2 COL4A3 COL4A4 COL4A5 COL4A6 COL9A2, EDM2 COL9A3 COLR COL5A1 COL5A2 COL6A1 COL6A2 COL6A3 COL7A1 COL10A1 COL11A1 COL11A1 COL11A1 COL17A1 COLQ	00000000000000000000000000000000000000
Colony-stimulating factor 1	CSF1	G
Colony-stimulating factor 1 receptor	CSF1R	Ğ
Colony-stimulating factor 2	CSF2 S	Ğ
Colony-stimulating factor 2 alpha receptor	CSF2RA	Ğ
Colony-stimulating factor 2 beta receptor	CSF2RB	G
Complex V	MTATP6	E
Cone-rod homeobox-containing gene	CRX	G
Contactin	CNTN1	G
Corticotrophin-releasing hormone	CRH	Т
Corticotrophin-releasing hormone receptor	CRHR1	Т
Creb binding protein	CREBBP	G
Cu2+ transporting ATPase beta polypeptide	ATP7B	E
Cyclic AMP response element binding protein	CREB	G
Cyclic AMP-dependent protein kinase	PKA	Ε
Cyclic nucleotide gated channel alpha 1, CNGA1	CNGA1	Ν
Cyclic nucleotide gated channel alpha 3, CNGA3	CNGA3	th N
Cyclic nucleotide phosphodiesterase 1B	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	Ē
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	Ē
Cyclic nucleotide phosphodiesterase 3B	PDE3B	Ē
Cyclic nucleotide phosphodiesterase 4A	PDE4A	Ε
	PDE4C	Ε
	PDE5A	Ε
Cyclic nucleotide phosphodiesterase 6A	PDE6A	Ε

Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclin-dependent kinase 2 Cyclooxygenase 1 Cyclooxygenase 2	PDE6B PDE7 PDE8 PDE9A CDK2 COX1 COX2	EEEGEE
CYP11A1	CYP11A1	E
CYP11B1	CYP11B1	Ε
CYP11B2 CYP17	CYP11B2	E
CYP19	CYP17 CYP19	E
CYP1A1	CYP1A1	E
CYP1A2	CYP1A2	E
CYP1B1	CYP1B1	E
CYP21	CYP21	E
CYP24	CYP24	Ē
CYP27	CYP27	Ē
CYP27B1	PDDR	E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	Ε
CYP2A3	CYP2A3	Ε
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A7	Ε
CYP2B6	CYP2B6	Ε
CYP2C18	CYP2C18	Ε
CYP2C19	CYP2C19	Ε
CYP2C8	CYP2C8	Ε
CYP2C9	CYP2C9	Ε
CYP2D6	CYP2D6	Ε
CYP2E1	CYP2E1	Ε
CYP2F1	CYP2F1	Ε
CYP2J2	CYP2J2	Ε
CYP3A3	CYP3A3	Ε
CYP3A4	CYP3A4	Ε
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	Ε
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	E
CYP4F3 CYP51	CYP4F3	Ε
CYP5A1	CYP51 CYP5A1	E
CYP7A	CYP7A	E
CYP8	CYP8	E
Cystathionase	CTH	E
Cystathionase Cystathione beta synthase	CBS	E
Cystatinone beta synthase Cystatin B	CSTB	T
Oysiaiii D	COID	1

Cystatin C	CST3	Т
Cystinosin	CTNS	Ť
Cytidine deaminase	CDA	Ė
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytochrome a	-	E
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	CSBP1	ī
binding protein 1		•
Cytokine-suppressive antiinflammatory drug-	CSBP2	ı
binding protein 2	,	ı
DAX1 nuclear receptor	DAX1	ı
Deafness autosomal dominant 5	DFNA5	NI.
Deafness dystonia peptide	DDP	N
Deleted in malignant brain tumours 1	DMBT1	N
Delta aminolevulinate dehydratase	ALAD	G
Delta-7-dehydrocholesterol reductase	DHCR7	E
DHEA sulfotransferase	STD	E
Diaphanous 1	DIAPH1	E
Diaphanous 2	DIAPH2	N
Dihydrolipoamide branched chain	- ·· · · · · 	N
transacylase	DBT	Ν
•	DI D	
Dihydrolipoamide dehydrogenase	DLD	N
Dihydrolipoyl dehydrogenase 2	PDHA	E
Dihydrolipoyl transacetylase	PDHA	E
Dihydroxyacetonephosphate acyltransferase	DHAPAT	E
DNA glycosylases DNA helicases		E
	1.104	E
DNA Ligase 1	LIG1	E
DNA methyltransferase	DNMT	E
DOPA decarboxylase	DDC	E
Dopamine beta hydroxylase	DBH	Ε
Dopamine receptors D1	DRD1	Ν
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	Ν
Dopamine receptors D5	DRD5	Ν
Doublecortin, DCX	DCX	S
Dynamin	DNM1	G
Dystonia 1	DYT1	S
	DYT3	S
	DYT6	S
	DYT7	S
	CSE	S
	DM, DMPK	Ε
	DM2	Ε
	DMD	S
Ectodermal Dysplasia 1 gene	ED1	S

Electron-transfering-flavoprotein alpha Electron-transfering-flavoprotein beta Electron-transferring flavoprotein dehydrogenase	ETFA ETFB ETFDH	T T E
Emerin Empty spiracles (drosophila) homologue 1 Empty spiracles (drosophila) homologue 2 Endobrevin Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Enolase Enoyl CoA isomerase	EMD EMX1 EMX2 VAMP8 EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB ENO1	T G G Z Z Z Z Z Z E E
Enoyl CoA reductase Enterokinase Ephrin-A Ephrin-B Epidermal growth factor Epidermal growth factor receptor Epilepsy, progressive myoclonic 2 gene EWS RNA-binding protein Excision repair complementation group 4	PRSS7, ENTK EFNA EFNB EGF EGFR EPM2A EWSR1 ERCC4	EEGGGGEGE
protein Exostosin 1 Exostosin 2 Factor 1 (No. one) Factor III Factor IX Factor V Factor VIII	EXT1 EXT2 F1 F3 F9 F5 F7	S S
Factor X Factor XI Factor XII Factor XIII A & B Fanconi anemia, complementation group A Fanconi anemia, complementation group C Fanconi anemia, complementation group D Fibrillin 2 Fibrinogen alpha Fibrinogen beta Fibrinogen gamma Fibroblast growth factor Fibroblast growth factor receptor 1 Fibroblast growth factor receptor 2	F10 F11 F12 F13A & F13B FANCA FANCC FANCD FBN2 FGA FGB FGG FGF1 FGFR1 FGFR2	

Fibroblast growth factor receptor 3 Fibronectin precursor Flightless-II, Drosophila homolog of Follicle stimulating hormone receptor Follicle stimulating hormone, FSH Forkhead transcription factor 10 Formiminotransferase Fragile site, folic acid type, rare, fra(X) A	FGFR3 FN1 FLII FSHR, ODG1 FSHB FKHL10	GGGGGEN
Fragile site, folic acid type, rare, fra(X) E	FRAXE	N
Fragile site, folic acid type, rare, fra(X) F	FRAXF	Ν
Frataxin	FRDA	G
Fructose-1,6-diphosphatase	FBP1	Ε
Fukuyama type congenital muscular	FCMD	G
dystrophy	04554	
GABA receptor, alpha 1	GABRA1 GABRA2	N
GABA receptor, alpha 2 GABA receptor, alpha 3	GABRA3	N N
GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	N
GABA receptor, beta 1	GABRB1	N
GABA receptor, beta 2	GABRB2	N
GABA receptor, beta 3	GABRB3	Ν
GABA receptor, gamma 1	GABRG1	Ν
GABA receptor, gamma 2	GABRG2	Ν
GABA receptor, gamma 3	GABRG3	Ν
GABA transaminase	ABAT	Ε
Galactocerebrosidase	GALC	E
Galactose 1-phosphate uridyl-transferase	GALT .	E
Galactosyltransferase 1	GT1	G
Galactosyltransferase, alpha 1,3	GGTA1	G
Galactosyltransferase, beta 3 Galanin	B3GALT GAL	G
Galanin receptor	GALNR1	N N
Gamma-glutamyltransferase 1	GGT1	T
Gap junction protein beta 2	GJB2	÷
Gap junction protein beta 3	GJB3	Ť
Gastric Intrinsic factor, GIF	GIF	Ė
Gastrulation brain homeobox 2	GBX2	G
Geniospasm 1	GSM1	G
Gephyrin		Ν
Glial-cell derived neurotrophic factor (GDNF)		Ν
receptor		
Glial-cell derived neurotrophic factor, GDNF	GDNF	Ν
Glucosidase, acid alpha	GAA	Ε
Glutamate decarboxylase, GAD	GAD1	E
Glutamate dehydrogenase	GLUD1	Ε
Glutamate receptor 1	GLUR1	Ν

GLUR2 GLUR3 GLUR4 GLUR5 GLUR6 GLUR7 NMDAR1 NMDAR2A NMDAR2B NMDAR2C NMDAR2D GLCLC GCDH GSH GSTZ1 GSS GAPDH	222222222
GK	E
GART	E
	· E
GLRA2	N
	N
	N
	Ε
	E
•	G
	G
	E
GNAO1	N
GNAI1	N
3.0	
GNAI2	N
011410	
GNAI3	N
GNAS1	N
GIAZOT	IN
GNAS2	N
011/102	
GNAS3	N
	• •
GNAS4	N
- · · · · · · ·	. 4
GNAT1	N
	. •
	GLUR3 GLUR4 GLUR5 GLUR6 GLUR7 NMDAR1 NMDAR2A NMDAR2B NMDAR2C NMDAR2D GLCLC GCDH GSH GSTZ1 GSS GAPDH GK GART GLDC GLRA2 GLYT PYGL GM2A GNRHR GCH1 GAMT GNA01 GNA11 GNA12 GNA13 GNAS1 GNAS2 GNAS3 GNAS4

Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	N
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	N
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	Ν
Guanine nucleotide-binding protein, q polypeptide	GNAQ	N
Guanylate cyclase 2D, membrane (retinaspecific)	GUCY2D	Ε
Guanylate cyclase activator 1A (retina) Guanylate kinase	GUCA1A · · · ·	E
Guanylyl cyclase Gustducin, alpha (taste-specific G protein) Haeme regulated inhibitor kinase	GDCA	E N E
Haemoglobin alpha 1	HBA1	Ŧ
Haemoglobin alpha 2	HBA2	Т
Haemoglobin beta	HBB	T
Haemoglobin delta	HBD	Т
Haemoglobin gamma A	HBG1	T
Haemoglobin gamma B	HBG2	Т
Haemoglobin gamma G	HBGG	Т
Heat shock protein, HSP60		i
Heat shock protein, HSP70		i
Heat shock protein, HSP90		i
Heat shock protein, HSPA1		i
Heat shock protein, HSPA2		i
Heparan sulfamidase		Ė
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	1
Hepatic lipase	LIPC	Ė
Hexosaminidase A	HEXA,TSD	E
Hexosaminidase B	HEXB	E
Hippocampal cholinergic neurostimulating per		N
Histamine receptors, H1	sude, HON	
Histamine receptors, H2		N
Histamine receptors, H3		N
Histidase		N
HLA-B associated transcript 1	BAT1	E
HLH transcription factor HAND1		1
HLH transcription factor HAND2	HAND1	G
•	HAND2	G
HMG-CoA reductions	HMGCL	E
HMG-CoA reductase	HMGCR	E
Holocarboxylase synthetase	HLCS	Ε
Homeobox HB9	HLXB9	G
Human atonal gene	ATOH1	G
Hypoxanthine-guanine	HPRT	Ε
phosphoribosyltransferase, HGPRT		

I to manage to describe for the second		
Hypoxia inducible factor 1	HIF1A	E
Hypoxia inducible factor 2		E
IC7 A and B		1
Inositol 1,4,5-triphosphate receptor 1	ITPR1	G
Inositol monophosphatase	IMPA1	N
Inositol polyphosphate 1-phosphatase	INPP1,	N
Insulin	INS	G
Insulin receptor	INSR	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	Ğ
Integrin beta 2	ITGB2	Ğ
Integrin beta 3	ITGB3	Ğ
Integrin, alpha 1	ITGA1	Ğ
Integrin, alpha M	ITGAM	G
Inter-alpha-trypsin inhibitor, IATI		. E
Interleukin(IL) 1 receptor	IL1R]
Interleukin(IL) 1, alpha	IL1A	1
Interleukin(IL) 1, beta	IL1B	,
Interleukin(IL) 10	IL10	. 1
Interleukin(IL) 10 receptor	IL10R	1
Interleukin(IL) 11	IL11	1
Interleukin(IL) 11 receptor	IL11R	1
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	i t
Interleukin(IL) 13	IL13	!
Interleukin(IL) 13 receptor	IL13R	; ;
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	1
Interleukin(IL) 2 receptor, gamma	IL2RG	
Interleukin(IL) 3	IL3	!
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4		
Interleukin(IL) 4 receptor	IL4	!
Interleukin(IL) 5	IL4R IL5	!
Interleukin(IL) 5 receptor	IL5R	
Interleukin(IL) 6		
` ·	IL6	!
Interleukin(IL) 6 receptor	IL6R	!
Interleukin(IL) 7	IL7	
Interleukin(IL) 7 receptor	IL7R	1
Interleukin(IL) 8	IL8	1
Interleukin(IL) 8 receptor	IL8R	
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	ı
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	1
IP3 kinase		E

•		
Isovaleric acid CoA dehydrogenas	se IVD	Е
Kallikrein 3	KAK3	Ī
Kallman syndrome gene 1	KAL1	Ġ
Ketohexokinase	KHK	Ē
Kininogen, High molecular weight	KNG	Ī
Kynureninease		Ė
L1 cell adhesion molecule	L1CAM	N
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	Ġ
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-b		G
binding protein 2		J
Leptin	LEP	G
Leptin receptor	LEPR	G
Leukaemia inhibitory factor	LIF	G
Leukaemia inhibitory factor receptor		G
Leukin	,	ı
Leukocyte-specific transcript 1	LST-1	. i
Leukotriene A4 hydrolase		
Leukotriene A4 synthase	LTA4S	Ė
Leukotriene B4 receptor	22	
Leukotriene B4 synthase	LTB4S	Ė
Leukotriene C4 receptor	2.2.0	_
Leukotriene C4 synthase	LTC4S	Ė
Leukotriene D4/E4 receptor		ī
LIM homeobox protein 1	LHX1	Ġ
LIM homeobox protein 2	LHX2	Ğ
LIM homeobox protein 3	LHX3	Ğ
LIM homeobox protein 4	LHX4	Ğ
Limbic associated membrane prote	in LAMP	Ğ
LIM-domain only protein 1	LMO1	Ğ
LIM-domain only protein 2	LMO2	Ğ
LIM-domain only protein 3	LMO3	Ğ
LIM-domain only protein 4	LMO4	
LIM-Kinase I (LINK-I)		G I
Lipoprotein receptor, Low Density	LDLR	Ť
Lipoprotein, High Density	HDLDT1	Ť
Lipoprotein, Intermediate Density	•	Ť
Lipoprotein, Low Density 1		Ť
Lipoprotein, Low Density 2		Ť
Lipoprotein, Very Low Density	VLDLR	Ť.
Low density lipoprotein receptor-rel	ated LRP	T
protein precursor		1
Lymphoid enhancer-binding factor	LEF-1	G
MAD (mothers against decapentapl		G
Drosophila) homologue 4	-	_
•		

Malonyl CoA decarboxylase		,
Mannosidase, alpha B lysosomal	MANB	E
Mannosidase, beta A lysosomal	MANBA	E E
Marenostrin	MEFV	T
Melatonin receptor 1A	MTNR1A	
Melatonin receptor 1B	MTNR1B	N
Methylguanine-DNA methyltransferase	MGMT	N
	MUT	Ē
Methylmalonyl-CoA mutase Mevalonate kinase		E
	MVK	· E
Microsomal triglyceride transfer protein	MTP	Ţ
Microtuble associated protein	MAP	S
Mismatch repair gene, PMSL2	PMS2	G
Molybdenum cofactor synthesis 1	MOCS1	E
Molybdenum cofactor synthesis 2	MOCS2	E
Monoamine oxidase A	MAOA	E
Monoamine oxidase B	MAOB	Ë
Msh homeobox homolog 2	MSX2	G
Mucolipidoses	GNPTA	Е
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Myelin protein peripheral 22	PMP22	S
Myelin protein zero	MPZ	S
Myogenic factor 3	MYF3	G
Myogenic factor 4	MYF4	G
Myogenic factor 5	MYF5	G
Myosin 15	MYO15	S
Myosin 6	MYO6	· S
Myosin 7A	MYO7A	S
Myotubularin	MTM1	S
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3	G
N-acetylglucosamine-6-sulfatase	GNS	E
N-acetylglucosaminidase, alpha	NAGLU	Е
NADH dehydrogenase		E
NADPH-dependent cytochrome P450	POR	Ε
reductase	•	
NB6		1
Nebulin	NEB	S
Necdin	NDN	G
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neural retina-specific gene	NRL	G
Neuraminidase sialidase	NEU	· T

Neuregulin	HGL	G
Neurite growth-promoting factor 2	MDK	N
Neurite inhibitory protein		N
Neuroendocrine convertase 1	NEC1, PCSK1	E
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurofilament protein, heavy	NFH	S
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68	NF68	S
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuronal apoptosis inhibitory protein	NAIP	1
Neuronal molecule-1		1
Neuronal molecule-1 receptor		i
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Neurotensin	NTS	N
Neurotensin receptor	NTSR1	N
Neutral endopeptidase		E
Niemann-Pick disease protein	NPC1	Ŧ
Nitric oxide synthase 1, NOS1	NOS1	Ė
Nitric oxide synthase 2, NOS2	NOS2	Ē
Nitric oxide synthase 3, NOS3	NOS3	Ē
Notch 1	NOTCH1	Ğ
Notch 2	NOTCH2	G
Notch 3	NOTCH3	G
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL	Ì
Nucleoside diphosphate kinase-A	NDPKA	E
Oncogene bcl2		G
Oncogene GLI1	GLI	G
Oncogene GLI2	GLI2	G
Oncogene GLI3	GLI3	G
Oncogene sis	PDGFB	G
Opioid receptor, delta	OPRD1	Ň
Opioid receptor, kappa	OPRK1	N
Opioid receptor, mu	OPRM1	N
Ornithine delta-aminotransferase	OAT	E
Ornithine transcarbamoylase	OTC, NME1	Ē
Orthodenticle (Drosophila) homolog 1	OTX1	Ğ
Orthodenticle (Drosophila) homolog 2	OTX2	Ğ
Otoferlin	OTOF	Ň
Paired box homeotic gene 2	PAX2	G ·
Paired box homeotic gene 3	PAX3	· G
Palmitoyl-protein thioesterase	PPT	Ť
Parkin	PARK2	Ň
•		

Patched (Drosophila) homolog, PTCH	PTCH	. G
Peanut-like 1	PNUTL1	1
Peptidylglycine alpha-amidating	PAM	Ε
monooxygenase		
Peripherin, PRPH		s
Peroxisomal membrane protein 1	PXMP1	S
Peroxisomal membrane protein 3	PXMP3	T
Peroxisome biogenesis factor 1	PEX1	Ť
Peroxisome biogenesis factor 19	PEX19	Ť
Peroxisome biogenesis factor 6	PEX6	Ť
Peroxisome biogenesis factor 7	PEX7	Ť
Peroxisome receptor 1	PXR1	Ť
Persyn	1 70001	Ś
Phosphate regulating gene with homologies	PHEX	G G
to endopeptidases on the X chromosome	THEX	G
Phosphatidylinositol transfer protein	PITPN	_
Phosphoglucose isomerase	GPI	G
Phosphoglycerate kinase 1	PGK1	E
, •		E
Phospholipase A2, group 10	PLA2G10	Į.
Phospholipase A2, group 1B	PLA2G1B	!
Phospholipase A2, group 2A	PLA2G2A	!
Phospholipase A2, group 2B	PLA2G2B	!
Phospholipase A2, group 4A	PLA2G4A	1
Phospholipase A2, group 4C	PLA2G4C	1
Phospholipase A2, group 5	PLA2G5	ı
Phospholipase A2, group 6	PLA2G6	i
Phospholipase C alpha		ı
Phospholipase C beta		1
Phospholipase C delta	PLCD1	I
Phospholipase C epsilon		1
Phospholipase C gamma	PLCG1	1
Phosphomannomutase 2	PMM2	G
Phosphoribosyl pyrophosphate synthetase	PRPS1	Ε
Phytanoyl-CoA hydroxylase	PHYH	G
Plakophilin 1	PKP1	Т
Plasminogen	PLG	E
Plasminogen activator inhibitor 1	PAI1	E
Plasminogen activator inhibitor 2	PAI2	· E
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	s
Plasminogen activator, Tissue	PLAT; TPA	Ē
Plasminogen activator, Urokinase	UPA; PLAU	Ē
Platelet derived growth factor	PDGF	Ğ
Platelet derived growth factor receptor	PDGFR	G
Platelet-activating factor receptor	PAFR	- 0
Plectin 1	PLEC1	Ť
Postsynaptic density-95 protein	PSD95	N
Potassium channel, calcium-activated,	KCNN4	
Potassium channel, subfamily K, member 1	KCNK1	N
. State and original, Subjecting 11, member 1	NONNI	N

Potassium channel, subfamily K, member 2 Potassium channel, subfamily K, member 3 Potassium inwardly-rectifying channel J1 Potassium voltage-gated channel A1 Potassium voltage-gated channel Q1 Potassium voltage-gated channel Q2 Potassium voltage-gated channel Q3 Potassium voltage-gated channel Q4 POU domain, class 1, transcription factor 1 (Pit1)	KCNK2 KCNK3 KCNJ1 KCNA1 KCNE1 KCNQ1 KCNQ2 KCNQ3 KCNQ4 POU1F1	2 2 2 2 2 2 2 G
POU domain, class 3, transcription factor 4	POU3F4	G
POU domain, class 4, transcription factor 3	POU4F3	G
Prekallikrein	DENIK	1
Preproenkephalin Presenilin 1	PENK	N
Presenilin 2	PSEN1	T
Prion protein	PSEN2 PRNP	T
Procollagen N-protease	FRINE	N
Proline dehydrogenase	PRODH	E
Pro-melanin-concentrating hormone	PMCH	G
Proopiomelanocortin	POMC	N
Prosaposin	PSAP	N
Prostacyclin synthase		1
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	i
Prostaglandin D - DP receptor	,	i
Prostaglandin E1 receptor	•	Í
Prostaglandin E2 receptor		ĺ
Prostaglandin E3 receptor		. 1
Prostaglandin F - FP receptor		1
Prostaglandin I2 receptor		T
Prostaglandin IP receptor		1
Protease nexin 2	PN2	Ε
Protective protein for beta-galactosidase	PPGB	Ε
Protein C	PROC	1
Protein C inhibitor	PCI	ı
Protein kinase C, alpha	PRKCA	Ε
Protein kinase C, gamma	PRKCG	Ε
Protein kinase G		Ε
Protein phosphatase 1, regulatory (inhibitor)	PPP1R3	Ε
subunit 3		
Protein S	PROS1	ı
Prothrombin precursor	F2	1
Purine nucleoside phosphorylase	NP DV00	Ε
Pyrroline-5-carboxylate synthetase	PYCS	Ε
Pyruvate carboxylase	PC	Ε
Pyruvate decarboxylase	PDHA	E
Ras-G-protein	RAS	G

Rathke pouch homeobox, RPX	RPX	G
Renin	REN	Ε
Replication factor C	RFC2	Ε
Retinal pigment epithelium specific protein	RPE65	S
(65kD)	5: 554	
Retinaldehyde binding protein 1	RLBP1	Т
Retinoblastoma 1	RB1	G
Rhodopsin kinase	RHOK	Ε
RIGUI	RIGUI	G
S100 calcium-binding protein A1	S100A1	Ν
S100 calcium-binding protein A2	S100A2	N
S100 calcium-binding protein A3	S100A3	N
S100 calcium-binding protein A4	S100A4	Ν
S100 calcium-binding protein A5	S100A5	Ν
S100 calcium-binding protein A6	S100A6	Ν
S100 calcium-binding protein A7	S100A7	Ν
\$100 calcium-binding protein A8	S100A8	N
\$100 calcium-binding protein A9	S100A9	Ν
S100 calcium-binding protein B	S100B	Ν
S100 calcium-binding protein P	S100P	Ν
Secretase, alpha		N
Secretase, beta	•	Ν
Secretase, gamma		Ν
Selectin E	SELE	Ν
Selectin L	SELL	N
Selectin P	SELP	N
Semaphorin A4	SEMA4	S
Semaphorin A5	SEMA5	S
Semaphorin D	0=1=	S
Semaphorin E	SEMAE	S
Semaphorin F	SEMA3/F	S
Semaphorin W	SEMAW	S
Serotonin N-acetyltransferase	SNAT	Ε
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	Ν
Serotonin receptor, 5HT2A	HTR2A	Ν
Serotonin receptor, 5HT2B	HTR2B	Ν
Serotonin receptor, 5HT2C	HTR2C	Ν
Serotonin receptor, 5HT3	HTR3	Ν
Serotonin receptor, 5HT4	HTR4	Ν
Serotonin receptor, 5HT5	HTR5	Ν
Serotonin receptor, 5HT6	HTR6	Ν
Serotonin receptor, 5HT7	HTR7	Ņ
Signaling lymphocyte activation molecule	SLAM	1

Slug protein Small nuclear ribonucleoprotein polypeptide	SNRPN	G S
N		3
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1,	SCNN1G	N
gamma	· · · · · · · · · · ·	• •
Sodium channel, voltage gated, type IV,	SCN4A	N
alpha polypeptide		• •
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide	30,115	14
Solute carrier family 1 (amino acid	SLC1A6	Т
transporter), member 6	0201710	•
Solute carrier family 1 (glial high affinity	SLC1A3	Т
glutamate transporter), member 3	CECTAG	,
Solute carrier family 1 (glutamate	SLC1A1	_
transporter), member 1	SECIAI	Т
Solute carrier family 1 (glutamate	SLC1A2	~
transporter), member 2	SLC 1A2	Τ
Solute carrier family 12, member 1	CL C12A1	-
Solute carrier family 12, member 2	SLC12A1	Ţ
	SLC12A2	T
Solute carrier family 12, member 3	SLC12A3	T
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	T
Solute carrier family 16 (monocarboxylate	SLC16A7	_
transporter), member 7	SLC TOAT	Ţ
Solute carrier family 18, member 3	SLC18A3	Τ.
Solute carrier family 2 (facilitated glucose	SLC2A1	T
transporter), member 1	SLOZAT	T
Solute carrier family 20, member 3	SI C2042	_
Solute carrier family 25, member 12	SLC20A3	T
	SLC25A12	T
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	T
·	01.0440	
Solute carrier family 4 (anion exchanger),	SLC4A2	T
member 2	0. 0.440	
Solute carrier family 4 (anion exchanger),	SLC4A3	T
member 3		
Solute carrier family 5 (sodium/glucose	SLC5A1	Τ.
transporter), member 1		
Solute carrier family 5 (sodium/glucose	SLC5A2	T
transporter), member 2		
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member	•	
1		
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
		-

transporter denomina) member 2		
transporter, dopamine), member 3	CLOCAD	
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2 Solute carrier family 6 (neurotransmitter	SLC6A4	-
	SLCOM4	Т
transporter, serotonin), member 4	CLOCAC	
Solute carrier family 6, member 6	SLC6A6	T
Solute carrier family 7(amino acid	SLC7A1	Т
transporter), member 1	CLOZAG	
Solute carrier family 7(amino acid	SLC7A2	Т
transporter), member 2	CI C747	-
Solute carrier family 7(amino acid	SLC7A7	Т
transporter), member 7 Somatostatin	CCT	A. 1
	SST	N
Somatostatin receptor, SSTR1	SSTR1	N
Somatostatin receptor, SSTR2	SSTR2	G
Somatostatin receptor, SSTR3	SSTR3	N
Somatostatin receptor, SSTR4	SSTR4	N
Somatostatin receptor, SSTR5	SSTR5	· N
Spastic paraplegia 7	SPG7	G
Spectrin beta	SPTB	S
Sphingomyelinase	SMPD1	E
Spinocerebellar ataxia 8 gene	SCA8	N
SRY-box 11	SOX11	G
Steroid 5 alpha reductase 1	SRD5A1	. Е
Steroid 5 alpha reductase 2	SRD5A2	E
Steroid sulphatase	STS	E
Substance P		N
Succinic semi-aldehyde dehydrogenase	ssadh	Ε
Sulfamidase	SGSH	G
Sulfite oxidase	SUOX	E
Superoxide dismutase 1	SOD1	E
Superoxide dismutase 3	SOD3	Ε
Surfeit 1	SURF1	G
Survival of motor neuron 1, telomeric	SMN1	T
Synapsin 1a & 1b	SYN1	N
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle amine transporter	SVAT	N
Synaptic vesicle protein 2	SV2	Ñ
Synaptobrevin 1	SYB1	N
Synaptobrevin 2	SYB2	N
Synaptogyrin		Ν
Synaptophysin	SYP	N
Synaptosomal-associated protein, 25KD	SNAP25	N
Synaptotagmin 1	SYT1	N
Synaptotagmin 2	SYT2	N
Syntaxin 1	STX1	N
Tachykinin receptor, NK1R	TACR1	N
Tachykinin receptor, NK2R	TACR2	N

Tachykinin receptor, NK3R	TACR3	N
Talin	TLN	G
Tau protein	MAPT	S
TEK, tyrosine kinase, endothelial	TEK	Ē
Telomerase protein component		Ē
Thiolase, perioxisomal		Ε
Thrombin receptor	F2R	Ī
Thrombopoietin	THPO	Ġ
Thromboxane A synthase 1	TBXAS1	Ī
Thromboxane A2	TXA2	i
Thromboxane A2 receptor	TBXA2R	i
Thy-1 T-cell antigen	THY1	i
Thyroxin-binding globulin	TBG	Ť
Tocopherol (alpha) transfer protein	TTPA	· T
Topoisomerase l'		Ė
Torticollis, keloids, cryptorchidism and renal	TKCR	Ğ
dysplasia gene		
Transacylase		Ε
Transferrin receptor	TFRC	G
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	
Transforming growth factor, beta receptor 2	TGFBR2	G
Transketolase-like 1	TKTL1	E
Transthyretin	TTR	Т
Tremor, essential 1	ETM1	Ν
Tremor, essential 2	ETM2	N
Triosephosphate isomerase	TPI1	Ε
Tropomyosin 3 (non-muscle)	TPM3	S
Tryptophan hydroxylase	TPH	Ε
Tubby-like protein 1	TULP1	G
Tuberous sclerosis 1	TSC1	G
Tuberous sclerosis 2	TSC2	G
Tumour necrosis factor (TNF) receptor	TRAF1	1
associated factor 1		
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		
Tumour necrosis factor (TNF) receptor	TRAF3	.1
associated factor 3		
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4		
Tumour necrosis factor (TNF) receptor	TRAF5	1
associated factor 5		
Tumour necrosis factor (TNF) receptor	TRAF6	1
associated factor 6		
Tumour necrosis factor alpha	TNFA	1
Tumour necrosis factor alpha receptor	TNFAR	1
Tumour necrosis factor beta	TNFB	1
Tumour necrosis factor beta receptor	TNFBR	Ī
•		

Tumour protein p53 Tumour protein p73 Tyrosine aminotransferase Tyrosine hydroxylase Ubiquitin Ubiquitin B Ubiquitin C Ubiquitin carboxyl-terminal esterase L1 UDP-glucuronosyltransferase 1 UDP-glucuronosyltransferase 2 Urate oxidase Uridinediphosphate(UDP)-galactose-4-epimerase	TP53, P53 TP73 TAT TH UBB UBC UCHL1 ugt1d, UGT1 UGT2 UOX GALE	
Uroporphyrinogen III synthase	UROS	E.
Usher syndrome 2A	USH2A	S
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	Ν
Vasoactive intestinal polypeptide	VIP	Ν
Vasoactive intestinal polypeptide receptor	VIPR	Ν
Vesicular monoamine transporter 1	VMAT1	Ν
Vesicular monoamine transporter 2	VMAT2	Ν
Vitamin B12-binding (R) protein		G
Von Hippel-Lindau gene	VHL	G
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	G
Wolfram syndrome 1 gene	WFS1	S
Xanthine dehydrogenase	XDH	Ε
Xeroderma pigmentosum, complementation	XPA	Ε
group A		
Zinc finger protein 2	ZIC2	S

- 71. A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 70.
- 72. A set according to claim 70 or 71 in which a minority of said probes for listed genes are absent.
- 73. A set according to claim 70 or 71 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 74. A set according to claim 70 or 71 in which a limited number of probes are replaced by probes for non-listed genes.

- 75. A set of probes for a core group of genes according to any of claims 70 to 74 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 76. A set according to any of claims 70 to 75 consisting of probes for members of a sub-group of the core group.
- 77. A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 78. A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 79. A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 80. A set according to claim 77 or 78 in which said substrate is a semiconductor microchip.
- 81. A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 82. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 83. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 84. A medical device including a set according to any of claims 70 to 82 for use in an array for detection of differential gene expression levels.
- 85. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 70) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 70 and 72 to 82 and relating the probe hybridisation pattern to said variations.
- A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 71) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 71 to 82 and relating the probe interaction pattern to said variations.
- 87. Use of a set or device according to any of claims 70 to 82 for the prognosis and management of patients suffering from or at risk of CNS dysfunction, damage or disease or experiencing the symptoms and consequences of CNS dysfunction, damage or disease.
- 88. Use of a set or device according to any of claims 70 to 82 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 89. Use of a set or device according to any of claims 70 to 82 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 90. Use of a set or device according to any of claims 70 to 82 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.

- 91. Use of a set or device according to any of claims 70 to 82 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 92. Use of a set or device according to any of claims 70 to 82 for the development of new strategies of therapeutic intervention and in clinical trials.
- 93. Use of a set or device according to any of claims 70 to 82 for construction of and generation of algorithms for patient and healthcare management.
- 94. Use of a set or device according to any of claims 70 to 82 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 95. Use of a set or device according to any of claims 70 to 82 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 96. Use of a set or device according to any of claims 70 to 82 for predicting optimum configuration/management of thereapeutic intervention.
- 97. A method according to claim 85 or 86 in which the identification of gene variants is indicative of a higher risk of developing CNS dysfunction, damage or disease or experiencing the symptoms and consequences of CNS dysfunction, damage or disease for the patient or individual.
- 98. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop CNS dysfunction, damage or disease or experiencing the symptoms and consequences of CNS dysfunction, damage or disease, which method comprises:
- i) obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from CNS dysfunction, damage or disease;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the CNS dysfunction, damage or disease;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 70 to 76:
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing symptoms and consequences of CNS dysfunction, damage or disease.
- 99. A method for assessing whether a given subject will be at risk of developing the symptoms and consequences of CNS dysfunction, damage or disease, which comprises comparing said subject's genotype with a model generated by the method of claim 98.
- 100. A method according to any of claims 85, 86, 98 and 99 wherein at least one step is computer-controlled.
- 101. An assay suitable for use in a method according to any of claims 85, 86, 98 and 99; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 70 to 76 in a biological sample.
- 102. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms and consequences of CNS dysfunction, damage or disease; said kit comprising:

- i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 70 or 72 to 76 in a sample of human DNA
- ii) reagents for use in the detection process
- iii) readout indicating the probability of a patient or individual developing the symptoms and consequences of CNS dysfunction, damage or disease.
- 103. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms and consequences of CNS dysfunction, damage or disease; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 71 to 76 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process readout indicating the probability of a patient or individual developing the symptoms and consequences of CNS dysfunction, damage or disease.
- 104. A set of probes according to claim 70, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 105.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to behavioural disturbance and aggression; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

BEHAVIOUR GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	E
4-hydroxyphenylpyruvate dioxygenase	HPD	E
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N

Acetylcholine receptor, nicotinic, alpha A6 Acetylcholine receptor, nicotinic, alpha A7	CHRNA6 CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1 Acetylcholine receptor, nicotinic, beta 2	CHRNB1 CHRNB2	.N N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	Ε
Adenylate cyclase 1	ADCY1	Ε
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	Ε
Adenylate cyclase 4	ADCY4	Ε
Adenylate cyclase 5	ADCY5	Ε
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	E
Adenylate cyclase 8	ADCY8	Ε
Adenylate cyclase 9	ADCY9	Ε
alpha-synuclein	SNCA	Ν
Amyloid beta A4 precursor protein	APP	Ν
Amyloid beta A4 precursor-like protein	APLP	Ν
Androgen binding protein	ABP	T
Androgen receptor	AR	G
Apolipoprotein E	APOE	T
Arginosuccinate synthetase	ASS	E
Ataxia telangiectasia gene, AT	ATM	G
beta-synuclein	SNCB	N
Ca(2+) transporting ATPase, slow twitch	ATP2A2	Т
Cannabinoid receptor	CNR1	Ν
Carbonic anhydrase 3	CA3	Ε
Carbonic anhydrase 4	CA4	Ε
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	Ε
Catechol-O-methyltransferase	COMT	Ε
Cholecystokinin	CCK	Ν
Cholecystokinin B receptor	CCKBR	Ν
Choline acetyltransferase	CHAT	Ε
Ciliary neurotrophic factor (CNTF)	CNTF	G
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	G
Corticotrophin-releasing hormone	CRH	T
Corticotrophin-releasing hormone receptor	CRHR1	T
Cryptochrome 1	CRY1	S
Cryptochrome 2	CRY2	S
Cu2+ transporting ATPase beta polypeptide	ATP7B	Ε
Cyclic AMP-dependent protein kinase		Ε
Cyclooxygenase 1		Ε
Cyclooxygenase 2		Ε
CYP11A1	CYP11A1	E

CYP11B1	CYP11B1	E
CYP11B2	CYP11B2	E
CYP17	CYP17	.E
CYP19	CYP19	, L
CYP1A1	CYP1A1	E
CYP1A2	CYP1A2	E
CYP1B1	CYP1B1	E
CYP21	CYP21	E
CYP24	CYP24	E
CYP27	CYP27	E
CYP27B1	PDDR	E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	E
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A7	E
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	E
CYP2C19	CYP2C19	E
CYP2C8	CYP2C8	E
CYP2C9	CYP2C9	
CYP2D6	CYP2D6	E
CYP2E1	CYP2E1	Ē
CYP2F1	CYP2F1	Ē
CYP2J2	CYP2J2	Ē
CYP3A3	CYP3A3	Ē
CYP3A4	CYP3A4	Ē
CYP3A5	CYP3A5	Ē
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	E
CYP4B1	CYP4B1	Ē
CYP4F2	CYP4F2	Ε
CYP4F3	CYP4F3	E
CYP51	CYP51	Ε
CYP5A1	CYP5A1	E
CYP7A	CYP7A	Е
CYP8	CYP8	, E
Cystathionase	CTH	E
Cystathione beta synthase	CBS	Ε
Cytidine deaminase	CDA	E
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytochrome a		E
Cytochrome c		E
Cytochrome c oxidase, MTCO		Ē
Dihydrolipoamide branched chain transacylase	DBT	N
Dopamine beta hydroxylase	DBH	E
Dopamine receptors D1	DRD1	. N
Dopamine receptors D2	DRD2	N

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Dopamine receptors D3 Dopamine receptors D4 Dopamine receptors D5 Doublecortin, DCX Enolase Flightless-II, Drosophila homolog of Fragile site, folic acid type, rare, fra(X) A Fragile site, folic acid type, rare, fra(X) E Fragile site, folic acid type, rare, fra(X) F GABA receptor, alpha 1 GABA receptor, alpha 2 GABA receptor, alpha 3 GABA receptor, alpha 4 GABA receptor, alpha 5 GABA receptor, beta 1 GABA receptor, beta 1 GABA receptor, beta 2 GABA receptor, beta 3 GABA receptor, gamma 1 GABA receptor, gamma 2 GABA receptor, gamma 3 Galactose 1-phosphate uridyl-transferase Geniospasm 1 Glutathione Glutathione Glutathione S-transferase, GSTZ1 Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	DRD3 DRD4 DRD5 DCX ENO1 FLII FRAXA FRAXE FRAXF GABRA1 GABRA2 GABRA3 GABRA4 GABRA5 GABRA6 GABRB1 GABRB2 GABRB3 GABRB3 GABRB3 GABRB3 GABRG1 GABRG1 GABRG2 GABRG3 GALT GSM1 GSH GSTZ1 GAPDH	スススの田のススススススススススススの田田田
Glycerol kinase	GK	E
Glycinamide ribonucleotide (GAR)	GART	E
transformylase		
GM2 ganglioside activator protein, GM2A	GM2A	Ε
Gustducin, alpha (taste-specific G protein)	GDCA	Ν
Inositol monophosphatase IP3 kinase	IMPA1	N
Mannosidase, beta A lysosomal	MANBA	E
Melatonin receptor 1A	MTNR1A	N
Melatonin receptor 1B	MTNR1B	N
Monoamine oxidase A	MAOA	E
Monoamine oxidase B	MAOB	Ē
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	Ν
Muscarinic receptor, M4	CHRM4	Ν
Muscarinic receptor, M5	CHRM5	Ν
N-acetylglucosamine-6-sulfatase	GNS	Ε
NADPH-dependent cytochrome P450	POR	Ε
reductase Neurokinin A	AUZALA	
INCUIONIIIII A	NKNA	Ν

Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Neurotensin	NTS	N
Neurotensin receptor	NTSR1	N
Nitric oxide synthase 1, NOS1	NOS1	Ë
Nitric oxide synthase 2, NOS2	NOS2	E
Nitric oxide synthase 3, NOS3	NOS3	E
Ocular albinism 1	OA1	s
Opioid receptor, delta	OPRD1	N
Opioid receptor, kappa	OPRK1	N
Opioid receptor, mu	OPRM1	N
Orexin	OX	G
Orexin 1 receptor	OX1R	G
Orexin 2 receptor	OX2R	Ğ
Phosphoglycerate kinase 1	PGK1	E
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium voltage-gated channel E1	KCNE1	N
Potassium voltage-gated channel Q1	KCNQ1	N
Preproenkephalin	PENK	N
Preproglucagon	GCG;GLP1; GLP2	G
Prion protein	PRNP	N
Proline dehydrogenase	PRODH	·E
Pro-melanin-concentrating hormone	PMCH	Ğ
Proopiomelanocortin	POMC	N
Purine nucleoside phosphorylase	NP	E
RIGUI	RIGUI	Ğ
Serotonin N-acetyltransferase	SNAT	žΕ
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Solute carrier family 18, member 3	SLC18A3	T
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ÁCID transporter), member 1		•
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		•
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Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2 Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		
Synapsin 1a & 1b	SYN1	N.
Synapsin 2a & 2b	SYN2	N
Synaptogyrin		N
Synaptophysin	SYP	N
Synaptosomal-associated protein, 25KD	SNAP25	· N
Syntaxin 1	STX1	N
Tachykinin receptor, NK1R	TACR1	N
Tachykinin receptor, NK2R	TACR2	N
Tachykinin receptor, NK3R	TACR3	N
Tau protein	MAPT	S
Tryptophan hydroxylase	TPH	Ε
Tyrosine hydroxylase	TH	Ε
Ubiquitin		G
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
UDP-glucuronosyltransferase 1	ugt1d, UGT1	· E
UDP-glucuronosyltransferase 2	UGT2	E
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	N
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	N

- 106.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 105.
- 107.A set according to claim 105 or 106 in which a minority of said probes for listed genes are absent.
- 108.A set according to claim 105 or 106 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 109.A set according to claim 105 or 106 in which a limited number of probes are replaced by probes for non-listed genes.
- 110. A set of probes for a core group of genes according to any of claims 105 to 109 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.

- 111. A set according to any of claims 105 to 110 consisting of probes for members of a sub-group of the core group.
- 112. A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 113. A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 114. A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 115. A set according to claim 112 or 113 in which said substrate is a semiconductor microchip.
- 116. A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 117. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 118. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 119. A medical device including a set according to any of claims 105 to 117 for use in an array for detection of differential gene expression levels.
- 120. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 105) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 105 and 107 to 117 and relating the probe hybridisation pattern to said variations.
- 121. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 106) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 106 to 117 and relating the probe interaction pattern to said variations.
- 122. Use of a set or device according to any of claims 105 to 117 for the prognosis and management of patients suffering from or at risk of developing aggressive symptoms or behavioural disturbance.
- 123. Use of a set or device according to any of claims 105 to 117 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 124. Use of a set or device according to any of claims 105 to 117 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 125. Use of a set or device according to any of claims 105 to 117 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 126. Use of a set or device according to any of claims 105 to 117 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.

- 127. Use of a set or device according to any of claims 105 to 117 for the development of new strategies of therapeutic intervention and in clinical trials.
- 128. Use of a set or device according to any of claims 105 to 117 for construction of and generation of algorithms for patient and healthcare management.
- 129. Use of a set or device according to any of claims 105 to 117 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 130. Use of a set or device according to any of claims 105 to 117 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 131. Use of a set or device according to any of claims 105 to 117 for predicting optimum configuration/management of thereapeutic intervention.
- 132. A method according to claim 120 or 121 in which the identification of gene variants is indicative of a higher risk of developing aggressive symptoms and/or behavioural disturbance for the patient or individual.
- 133. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop aggressive symptoms and/or behavioural disturbance which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from aggressive symptoms and/or behavioural disturbance;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from aggressive symptoms and/or behavioural disturbance;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 105 to 111;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing aggressive symptoms and/or behavioural disturbance.
- 134. A method for assessing whether a given subject will be at risk of developing aggressive symptoms and/or behavioural disturbance, which comprises comparing said subject's genotype with a model generated by the method of claim 133.
- 135. A method according to any of claims 120, 121, 133and 134 wherein at least one step is computer-controlled.
- 136. An assay suitable for use in a method according to any of claims 120, 121, 133 and 134; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 105 to 111 in a biological sample.
- 137. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing aggressive symptoms and/or behavioural disturbance; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 105 or 107 to 111 in a sample of human DNA;

- ii) reagents for use in the detection process
- readout indicating the probability of a patient or individual developing aggressive symptoms and/or behavioural disturbance.
- 138. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing aggressive symptoms and/or behavioural disturbance; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 106 to 111 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process
 - readout indicating the probability of a patient or individual developing aggressive symptoms and/or behavioural disturbance.
- 139. A set of probes according to claim 105, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 140. A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to brain injury; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

BRAIN INJURY GENE LIST	HUGO gene symbol	Protein function
2,3-bisphosphoglycerate mutase	BPGM	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	· E
4-hydroxyphenylpyruvate dioxygenase	HPD	E
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	· E
6-pyruvoyltetrahydropterin synthase	PTS	E
Acetoacetyl 2-CoA-thiolase	ACAT2	Ē
Acetyl CoA acyltransferase	ACAA	Ē
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N

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Acetylcholine receptor, nicotinic, alpha A5 Acetylcholine receptor, nicotinic, alpha A6	CHRNA5 CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Adducin, alpha	ADD1	S
Adducin, beta	ADD2	S
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N
Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	N
Adenylate cyclase 1	ADCY1	Ε
Adenylate cyclase 2	ADCY2	Ε
Adenylate cyclase 3	ADCY3	Ε
Adenylate cyclase 4	ADCY4	Ε
Adenylate cyclase 5	ADCY5	Ε
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	Ε
Adenylate cyclase 8	ADCY8	Ε
Adenylate cyclase 9	ADCY9	E
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH)	ADRB3 ACTHR	N
receptor	ACINK	G
Albumin, ALB	ALB	Т
Aldehyde dehydrogenase 10	ALDH10	Ė
Aldosterone receptor	MLR	G
Alpha 1 acid glycoprotein	AAG; AGP	T
Alpha 2 macroglobulin	A2M	i
alpha thalassemia gene	ATRX	N
alpha1-antitrypsin	PI	Ε
alpha2-antiplasmin	PLI	E
alpha-synuclein	SNCA	Ν
Aminomethyltransferase	AMT	Ε
Aminopeptidase P	XPNPEP2	Ε
Amyloid beta (A4) precursor protein-binding,	APBB1	·N
APBB1		
Amyloid beta A4 precursor protein	APP	N
Amyloid beta A4 precursor-like protein	APLP	Ν
Angiopoietin 1	ANGPT1	G

Angiopoietin 2 Angiotensin converting enzyme Angiotensin receptor 1 Angiotensin receptor 2 Angiotensinogen Annexin 1 Antidiuretic hormone receptor Antithrombin III Apolipoprotein A I Apolipoprotein B Apolipoprotein C1 Apolipoprotein C2 Apolipoprotein C3 Apolipoprotein B Apolipoprotein B Apolipoprotein B Apolipoprotein H Apoptosis antigen 1 Arginase Arginine vasopressin receptor 1A Arginine vasopressin receptor 1B Arginine vasopressin receptor 2 Arginosuccinate lyase Arylsulfatase A Arylsulfatase E Arylsulfatase E Arylsulfatase F Aspartoacylase Atrial natriuretic peptide Atrial natriuretic peptide receptor B Atrial natriuretic peptide receptor C Bagpipe homeobox, drosophila homolog of, beta-synuclein Bleomycin hydrolase Bradykinin receptor B2 Brain derived neurotrophic factor Brain derived neurotrophic factor Brain derived neurotrophic factor	ANGPT2 ACE, DCP1 AGTR1 AGTR2 AGT ANX 1 ADHR AT3 APOA1 APOA2 APOB APOC2 APOC3 APODE APOH APT1 AVP AVPR1B AVPR2 ASL ASS ARSA ARSD ARSE ARSF ASPA ATM ANP NPR1 NPR2 NPR3 1 BAPX1 SNCB BLMH BDNF BDNF BDNFR	G H T H - T H T T T T T T T T T - E Z Z Z Z E E E E E E E E G G G G G Z E G G
Butyrylcholinesterase	BCHE	E
Ca(2+) transporting ATPase, slow twitch	ATP2A2	T
Cadherin E	CDH1	Ġ
Cadherin EP		Ğ
Cadherin N	CDH2	G
		_

Cadherin P	CDH3	G
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	Ī
Calcineurin A2	CALNA2	i
Calcineurin A3	CALNA3	_ i .
Calcineurin B		i
Calcitonin/Calcitonin gene-related peptide	CALCA	N
alpha	3,123,1	•
Calcium channel, voltage-dependent, alpha	CACNA1F	Ν
1F subunit	G, 13. I, 1.1.	
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)	G/13/1/12	14
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C	5/16/1/10	1.4
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N
1D	CACITATE	14
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)	CACHATE	1.4
Calcium channel, voltage-dependent, Alpha-	CACNAS	N
2/delta	CACNAZ	IN
Calcium channel, voltage-dependent, Beta 1	CACNB1	N
Calcium channel, voltage-dependent, Beta 3	CACNB3	
Calcium channel, voltage-dependent, Leta 3		N
alpha 1S subunit	CACINATS	N
Calcium channel, voltage-dependent,	CACNG2	N.I
Neuronal, Gamma	CACINGZ	Ν
Calcium channel, voltage-dependent, P/Q	CACNA1A	N
type, alpha 1A subunit	CACINATA	IN
Calcium channel, voltage-dependent, T-type		N.I
Calmodulin 1	CALM1	N
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CAMK2A	G
Calmodulin-dependant protein kinase n Calnexin		G
-	CARN CARNS	G
Calpain Calretinin	CALDO	Ε
	CALB2	N
Carbonic anhydrase 3	CA3	E,
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	Ε
Cardiac-specific homeobox, CSX	CSX	G
Carnosinase	0.054	N
Caspase 1	CASP1	G
Caspase 10	CASP10	G
Caspase 2	CASP2	G
Caspase 3	CASP3	G
Caspase 4	CASP4	G

Caspase 5 Caspase 6 Caspase 7 Caspase 8 Caspase 9 Catechol-O-methyltransferase CD1 CD4 Cell adhesion molecule, intercellular, ICAM Cell adhesion molecule, leukocyte- endothelial, LECAM (CD62)	CASP5 CASP6 CASP7 CASP8 CASP9 COMT CD1 CD4 ICAM1 LECAM1	G G G G E G G
Cell adhesion molecule, liver, LCAM Cell adhesion molecule, neural, NCAM1 Cell adhesion molecule, neural, NCAM120 Cell adhesion molecule, neural, NCAM2 Cell adhesion molecule, platelet-endothelial, PECAM	LCAM NCAM1 NCAM120 NCAM2 PECAM1	G G G G
Cell adhesion molecule, vascular, VCAM Ceroid lipofuscinosis neuronal 2 Ceroid lipofuscinosis neuronal 3 Ceroid lipofuscinosis neuronal 4 Ceroid lipofuscinosis neuronal 5 Ceroid lipofuscinosis neuronal 6 Chemokine receptor CXCR4 Choline acetyltransferase	VCAM1 CLN2 CLN3 CLN4 CLN5 CLN6 CXCR4 CHAT	G Z Z Z Z Z – H
Chymotrypsinogen Cockayne syndrome gene, CKN1 Cofilin Collagen I alpha 1 Collagen I alpha 2 Collagen II alpha 1 Collagen III alpha 1	CKN1 COL1A1 COL1A2 COL2A1 COL3A1	EGSSSSS
Collagen IV alpha 1 Collagen IV alpha 2 Collagen IV alpha 3 Collagen IV alpha 4 Collagen IV alpha 5 Collagen IV alpha 6 Collagen IX alpha 2	COL4A1 COL4A2 COL4A3 COL4A4 COL4A5 COL4A6 COL9A2, EDM2	S S S S S S S
Collagen IX alpha 3 Collagen receptor Collagen V alpha 1 Collagen V alpha 2 Collagen VI alpha 1 Collagen VI alpha 2 Collagen VI alpha 2 Collagen VI alpha 3 Collagen VII alpha 1 Collagen X alpha 1 Collagen X alpha 1	COL9A3 COLR COL5A1 COL5A2 COL6A1 COL6A2 COL6A3 COL7A1 COL10A1	8 8 8 8 8 8 8 8

Collagen XVII alpha 1 Corticotrophin-releasing hormone CRH TCOrticotrophin-releasing hormone CRHR1 TCREBBP CU2+ transporting ATPase beta polypeptide Cyclic AMP-dependent protein kinase Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclooxygenase 1 COX1 Cyclooxygenase 2 COX2 CYP11A1 CYP11B1 CYP11B1 CYP11B1 CYP11B1 CYP11B2 CYP17 CYP19 CYP19 CYP19 CYP10 CYP10 CYP10 CYP10 CYP10 CYP10 CYP10 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP11 CYP21 CYP24 CYP24 CYP24 CYP24 CYP24 CYP24 CYP24 CYP24 CYP2A1 CYP2	Collagen X alpha 1 Collagen XI alpha 2 Collagen XVII alpha 1	COL11A1 COL11A2 COL17A1	S
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Cyclic nucleotide phosphodiesterase 9A PDE9A E Cyclooxygenase 1 COX1 E Cyclooxygenase 2 COX2 E CYP11A1 CYP11B1 E CYP11B1 CYP11B1 E CYP11B2 CYP11B2 E CYP17 CYP17 E CYP19 CYP19 E CYP19 CYP19 E CYP19 CYP19 E CYP1A1 CYP1A1 E CYP1A2 CYP1A2 E CYP1A2 CYP1A2 E CYP1A2 CYP1A2 E CYP2H1 E CYP2H1 E CYP2H1 E CYP2H1 E CYP2H1 CYP2H1 E CYP2H1 E CYP2H1 CYP2H1 CYP2H1 E CYP2H1 E CYP2H1 CYP2H1 CYP2A1 E CYP2A1 E CYP2A1 E CYP2A1 E CYP2A1 E CYP2A1	•		
Cyclooxygenase 1 COX1 E Cyclooxygenase 2 COX2 E CYP11A1 CYP11B1 E CYP11B1 CYP11B1 E CYP11B2 CYP11B2 E CYP17 CYP17 E CYP19 CYP19 E CYP19 CYP19 E CYP1A1 CYP1A1 E CYP1A2 CYP1A2 E CYP1A1 CYP1A2 E CYP1B1 CYP1B1 E CYP21 E CYP24 E CYP24 CYP24 E CYP27 CYP27 E CYP27 CYP27 E CYP27 CYP27 E CYP27 CYP27 E CYP27 CYP27 E CYP27 CYP27 E CYP27 CYP2A1 E CYP2A3 CYP2A3 E CYP2A6 CYP2A7 E CYP2A7 CYP	·		
Cyclooxygenase 2 COX2 E CYP11A1 E CYP11B1 E CYP11B2 E CYP17 CYP18 CYP19 E CYP19 E CYP1A1 CYP19 CYP1A2 CYP1A1 CYP1A2 E CYP1A2 CYP1A2 CYP1B1 CYP1B1 CYP21 C CYP24 C CYP27 CYP24 CYP27 CYP27 CYP27 CYP27 CYP27 C CYP27 C CYP27 C CYP27 C CYP27 C CYP27 C CYP27 C CYP27 C CYP27 C CYP27 C CYP27 C CYP2A1 C CYP2A3 C CYP2A6 C CYP2A6 C C			
CYP11A1 E CYP11B1 E CYP11B2 E CYP17 CYP17 CYP19 CYP19 CYP1A1 E CYP1A2 CYP1A1 CYP1B1 CYP1B1 CYP21 CYP21 CYP24 CYP21 CYP27 C CYP27 C CYP27B1 PDDR CYP2A1 C CYP2A1 C CYP2A3 C CYP2A3 C CYP2A3 C CYP2A6V2 C CYP2A6V2 C CYP2A6V2 C CYP2A6V2 C CYP2A6V2 E CYP2A6V2 C CYP2A6V2 C CYP2A6V2 E CYP2A6V2 C CYP2B6 E CYP2C18 E CYP2C19 E CYP2C20 E CYP2C20 E		•	
CYP11B1 E CYP11B2 E CYP17 CYP17 E CYP19 CYP19 E CYP1A1 CYP1A1 E CYP1A2 CYP1A2 E CYP1B1 CYP1B1 E CYP21 CYP21 E CYP24 CYP24 E CYP27 CYP27 E CYP27B1 PDDR E CYP2A1 CYP2A1 E CYP2A13 CYP2A1 E CYP2A3 CYP2A3 E CYP2A3 CYP2A3 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2A7 CYP2B6 E CYP2B6 CYP2B6 E CYP2C18 CYP2C19 E CYP2C19 CYP2C19 E CYP2C8 CYP2C9 E CYP2D6 CYP2D6 E CYP2F1 CYP2F1 E CYP2J2 E CYP2J2 E			
CYP11B2 E CYP17 CYP17 CYP19 CYP19 E CYP1A1 CYP1A2 E CYP1A2 E CYP1B1 E CYP2B1 CYP2B1 CYP24 CYP24 CYP27 CYP27 CYP27B1 PDDR CYP2A1 CYP2A1 CYP2A13 CYP2A13 CYP2A3 CYP2A3 CYP2A3 CYP2A3 CYP2A6V2 CYP2A6V2 CYP2A7 CYP2A7 CYP2B6 CYP2B6 CYP2C18 CYP2C18 CYP2C19 CYP2C19 CYP2C8 CYP2C8 CYP2C9 E CYP2D6 CYP2D6 CYP2E1 CYP2E1 CYP2F1 CYP2F1 CYP2J2 E	CYP11B1		
CYP17 E CYP19 E CYP1A1 E CYP1A2 E CYP1A2 E CYP1B1 E CYP2B1 CYP2B1 E CYP24 CYP24 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP2A1 E CYP2A1 CYP2A1 E CYP2A3 CYP2A3 E CYP2A3 CYP2A3 E CYP2A6V2 CYP2A7 E CYP2A7 CYP2A7 E CYP2A7 CYP2B6 E CYP2B6 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C9 E CYP2C9 CYP2D6 CYP2D6 CYP2E1 CYP2E1 E CYP2J2 CYP2J2 E	CYP11B2		
CYP19 E CYP1A1 E CYP1A2 E CYP1A2 E CYP1B1 E CYP21 E CYP21 E CYP24 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP27 E CYP2A1 E CYP2A1 E CYP2A1 E CYP2A3 E CYP2A3 E CYP2A6V2 E CYP2A6V2 E CYP2A7 E CYP2A7 E CYP2A7 E CYP2B6 E CYP2C18 E CYP2C19 E CYP2C8 E CYP2C9 E CYP2D6 E CYP2F1 E	CYP17		
CYP1A1 E CYP1A2 E CYP1B1 CYP1B1 E CYP21 CYP21 E CYP24 CYP24 E CYP27 CYP27 E CYP27B1 PDDR E CYP2A1 CYP2A1 E CYP2A13 CYP2A13 E CYP2A3 CYP2A3 E CYP2A3 CYP2A3 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2A7 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C18 E CYP2C19 CYP2C19 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 E CYP2J2 E	CYP19		
CYP1A2 E CYP1B1 E CYP21 E CYP24 CYP24 E CYP27 CYP27 E CYP27B1 PDDR E CYP2A1 CYP2A1 E CYP2A13 CYP2A13 E CYP2A3 CYP2A3 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2J2 E	CYP1A1		
CYP1B1 CYP21 E CYP21 CYP21 E CYP24 CYP24 E CYP27 CYP27 E CYP27B1 PDDR E CYP2A1 E CYP2A1 E CYP2A13 CYP2A13 E CYP2A3 CYP2A3 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2J2 E	CYP1A2	CYP1A2	
CYP21 E CYP24 E CYP27 E CYP2781 PDDR E CYP2A1 E CYP2A13 CYP2A13 E CYP2A3 CYP2A3 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2J2 E	CYP1B1	CYP1B1	
CYP24 E CYP27 E CYP27B1 PDDR E CYP2A1 E CYP2A13 CYP2A13 E CYP2A3 CYP2A3 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 C CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 E	CYP21	CYP21	
CYP27 E CYP27B1 PDDR E CYP2A1 CYP2A1 E CYP2A13 CYP2A13 E CYP2A3 CYP2A6V2 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 C E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E	CYP24	CYP24	
CYP2A1 CYP2A1 E CYP2A13 CYP2A3 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E	CYP27	CYP27	
CYP2A13 CYP2A13 E CYP2A3 CYP2A6V2 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E	CYP27B1	PDDR	
CYP2A3 CYP2A6V2 E CYP2A6V2 CYP2A6V2 E CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2J2 E	CYP2A1	CYP2A1	Ε
CYP2A6V2 E CYP2A7 E CYP2B6 E CYP2C18 E CYP2C19 CYP2C19 CYP2C8 E CYP2C9 CYP2C9 CYP2D6 CYP2D6 CYP2E1 E CYP2F1 CYP2F1 CYP2J2 E	CYP2A13	CYP2A13	Ε
CYP2A7 CYP2A7 E CYP2B6 CYP2B6 E CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E	CYP2A3	CYP2A3	Ε
CYP2A7 E CYP2B6 E CYP2C18 CYP2C18 CYP2C19 CYP2C19 CYP2C8 CYP2C8 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E	CYP2A6V2	CYP2A6V2	
CYP2C18 CYP2C18 E CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E		CYP2A7	
CYP2C19 CYP2C19 E CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E	CYP2B6	CYP2B6	Ε
CYP2C8 CYP2C8 E CYP2C9 CYP2C9 E CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E	CYP2C18	CYP2C18	Ε
CYP2C8 E CYP2C9 E CYP2D6 E CYP2E1 CYP2E1 CYP2F1 CYP2F1 CYP2J2 E		CYP2C19	Ε
CYP2D6 CYP2D6 E CYP2E1 CYP2E1 E CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E		CYP2C8	
CYP2E1 E CYP2F1 E CYP2J2 CYP2J2		CYP2C9	Ε
CYP2F1 CYP2F1 E CYP2J2 CYP2J2 E		CYP2D6	Е
CYP2J2 CYP2J2 E			
			Ε
CYP3A3 CYP3A3 E			
	CYP3A3	CYP3A3	Ε

CYP3A4	CYP3A4	Е
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	Ē
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	E
CYP4F3	CYP4F3	Ē
CYP51	CYP51	E
CYP5A1	CYP5A1	E
CYP7A	CYP7A	F
CYP8	CYP8	E E
Cystatin B	CSTB	Ţ
Cystatin C	CST3	Ť
Cytidine-5-prime-triphosphate synthetase	CTPS	Ė
Cytochrome a	· · · ·	E
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	CSBP1	1
binding protein 1	3021 1	
Cytokine-suppressive antiinflammatory drug-	CSBP2	
binding protein 2		I
DAX1 nuclear receptor	DAX1	
Deleted in malignant brain tumours 1	DMBT1	-
Delta-7-dehydrocholesterol reductase	DHCR7	G E
Dihydrolipoamide branched chain	DBT	N
transacylase		1.4
Dihydroxyacetonephosphate acyltransferase	DHAPAT	Ε
Dopamine beta hydroxylase	DBH	E
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	N
Dopamine receptors D5	DRD5	N
Dystonia 9	CSE	S
Dystrophia myotonica	DM, DMPK	
Dystrophia myotonica, atypical	DM2	E
Dystrophin	DMD	E S
Ectodermal Dysplasia 1 gene	ED1	S
Empty spiracles (drosophila) homologue 1	EMX1	G
Empty spiracles (drosophila) homologue 2	EMX2	G
Endothelin 1	EDN1	N
Endothelin 2	EDN2	
Endothelin 3	EDN3	N
Endothelin converting enzyme	ECE1	N
Endothelin receptor type A	EDNRA	N
Endothelin receptor type B	EDNRB	N
Enolase	ENO1	N
Epidermal growth factor	EGF	E
-Francisco Biotici Idoloi	LGI	G

Epidermal growth factor receptor Epilepsy, benign neonatal 4 gene Epilepsy, female restricted Epilepsy, progressive myoclonic 2 gene Excision repair complementation group 4 protein	EGFR ICCA EFMR EPM2A ERCC4		G E E E
Factor 1 (No. one)	F1		ı
Factor III	F3		1
Factor IX	F9		1
Factor V	F5		1
Factor VII	F7		,
Factor VIII	F8		i
Factor X	F10		i
Factor XI	F11		i
Factor XII	F12		i
Factor XIII A & B	F13A & F13B		i
Fanconi anemia, complementation group C	FANCC		Ť
Fanconi anemia, complementation group D	FANCD		Т
Fibrinogen alpha	FGA	·	S
Fibrinogen beta	FGB		S
Fibrinogen gamma	FGG		S
Fibroblast growth factor	FGF1		G
Fibroblast growth factor receptor 1	FGFR1		G
Fibroblast growth factor receptor 2	FGFR2		G
Fibroblast growth factor receptor 3	FGFR3		G
Fibronectin precursor	FN1		G
Flightless-II, Drosophila homolog of	FLII		G
Follicle stimulating hormone receptor	FSHR, ODG1		G
Follicle stimulating hormone, FSH	FSHB		G
Formiminotransferase	ED A V A		E
Fragile site, folic acid type, rare, fra(X) A	FRAXA		N
Fragile site, folic acid type, rare, fra(X) E Fragile site, folic acid type, rare, fra(X) F	FRAXE FRAXF		N
Frataxin	FRDA		N
Fukuyama type congenital muscular	FCMD		G G
dystrophy	·		G
Fumarase	FH		Ε
GABA receptor, alpha 1	GABRA1		N
GABA receptor, alpha 2	GABRA2	•	N
GABA receptor, alpha 3	GABRA3		N
GABA receptor, alpha 4	GABRA4		N
GABA receptor, alpha 5	GABRA5		Ν
GABA receptor, alpha 6	GABRA6		Ν
GABA receptor, beta 1	GABRB1		Ν
GABA receptor, beta 2	GABRB2		Ν
GABA receptor, beta 3	GABRB3		N
GABA receptor, gamma 1	GABRG1		Ν
GABA receptor, gamma 2	GABRG2		Ν

GABA receptor, gamma 3 GABA transaminase Galactosyltransferase 1 Galactosyltransferase, alpha 1,3 Galactosyltransferase, beta 3 Galanin Galanin receptor Gamma-glutamyltransferase 1 Gastric Intrinsic factor, GIF	GABRG3 ABAT GT1 GGTA1 B3GALT GAL GALNR1 GGT1 GIF	NEGGGNNTE
GDP dissociation inhibitor 1 Glial-cell derived neurotrophic factor (GDNF)	GDI1	Ğ
receptor		14
Glial-cell derived neurotrophic factor, GDNF Glioma chloride ion channel, GCC	GDNF	N G
Glutamate decarboxylase, GAD	GAD1	E
Glutamate receptor 1	GLUR1	Ν
Glutamate receptor 2	GLUR2	Ν
Glutamate receptor 3	GLUR3	Ν
Glutamate receptor 4	GLUR4	Ν
Glutamate receptor 5	GLUR5	Ν
Glutamate receptor 6	GLUR6	Ν
Glutamate receptor 7	GLUR7	Ν
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	Ν
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
Glutaryl-CoA dehydrogenase	GCDH	E
Glutathione	GSH	T
Glutathione S-transferase, GSTZ1	GSTZ1	Ė
Glutathione synthetase	GSS	Ē
Glyceraldehyde-3-phosphate	GAPDH	E
dehydrogenase, GAPDH	<i>O. i. D.</i> 1	_
Glycerol kinase	GK	Е
Glycinamide ribonucleotide (GAR)	GART	_
transformylase	<i>-</i>	Е
Glycine dehydrogenase	GLDC	Ε
GM2 ganglioside activator protein, GM2A	GM2A	E
Gonadotropin releasing hormone receptor	GNRHR	G
GTP cylcohydrolase 1	GCH1	G
Guanine nucleotide-binding protein, alpha	GNAO1	N
activating activity polypeptide, GNAO		1.81
Guanylate cyclase 2D, membrane (retinaspecific)	GUCY2D	Ė
Guanylate cyclase activator 1A (retina)	GUCA1A	Ε
Guanylyl cyclase		E
Haeme regulated inhibitor kinase		E
Haemoglobin alpha 1	HBA1	T
	·	1

Haemoglobin alpha 2 Haemoglobin beta Haemoglobin delta Haemoglobin gamma A Haemoglobin gamma B	HBA2 HBB HBD HBG1 HBG2	T T T T
Haemoglobin gamma G Heparan sulfamidase Heparin binding epidermal growth factor	HBGG HBEGF	T E G
Heparin Cofactor II Hepatic lipase	HCF2 LIPC	I E
Hexosaminidase A Hexosaminidase B	HEXA,TSD HEXB	Ε
Histamine receptors, H1	HEAD	E N
Histamine receptors, H2 Histamine receptors, H3	,	N
Histidase		N E
HLA-B associated transcript 1 HMG-CoA reductase	BAT1	1
Holocarboxylase synthetase	HMGCR HLCS	E
Holoprosencephaly 1	HPE1	G
Holoprosencephaly 2	HPE2	G
Holoprosencephaly 3	HPE3	G
Holoprosencephaly 4	HPE4	G
Hypoxia inducible factor 1	HIF1A	E
Hypoxia inducible factor 2 IC7 A and B		E
Inositol 1,4,5-triphosphate receptor 1	ITPR1	Ġ
Inositol monophosphatase	IMPA1	N
Insulin	INS	G
Insulin receptor	INSR	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 3	ITGB3	G
Integrin beta 4 Integrin beta 5	ITGB4 ITGB5	G
Integrin beta 5	ITGB6	G
Integrin beta 7	ITGB7	G G
Integrin, alpha 1	ITGA1	G
Integrin, alpha 2	ITGA2	G
Integrin, alpha 3	ITGA3	Ğ
Integrin, alpha 4	ITGA4	Ğ
Integrin, alpha 5	ITGA5	Ğ
Integrin, alpha 6	ITGA6	Ğ
Integrin, alpha 7	ITGA7	G

Integrin, alpha 8	ITGA8	G
Integrin, alpha 9	ITGA9	G
Integrin, alpha M	ITGAM	G
Integrin, alpha X	ITGAX	G
Inter-alpha-trypsin inhibitor, IATI	110/00	E
Interleukin(IL) 1 receptor	IL1R	
Interleukin(IL) 1, alpha	IL1A	!
Interleukin(IL) 1, beta	IL1B	1
Interleukin(IL) 10	IL10	i
Interleukin(IL) 10 receptor	IL10R	i
Interleukin(IL) 11		1
Interleukin(IL) 11 receptor	IL11	1
· ·	IL11R	i
Interleukin(IL) 12	IL12	!
Interleukin(IL) 12 receptor, beta 1	IL12RB1	i
Interleukin(IL) 13	IL13	l l
Interleukin(IL) 13 receptor	IL13R	1
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	· I
Interleukin(IL) 2 receptor, gamma	IL2RG	!
Interleukin(IL) 3	IL3	. !
Interleukin(IL) 3 receptor	IL3R	. 1
Interleukin(IL) 4	IL4	1
Interleukin(IL) 4 receptor	IL4R	1
Interleukin(IL) 5	IL5	1
Interleukin(IL) 5 receptor	IL5R	ŀ
Interleukin(IL) 6	IL6	1
Interleukin(IL) 6 receptor	IL6R	1
Interleukin(IL) 7	IL7	I
Interleukin(IL) 7 receptor	IL7R	1
Interleukin(IL) 8	IL8	1
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9	1.
Interleukin(IL) 9 receptor	IL9R	1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	1
IP3 kinase		E
Kallikrein 3	KAK3	· ī
Kininogen, High molecular weight	KNG	i
Kynureninease		E
Laminin 5, alpha 3	LAMA3	Ğ
Laminin 5, beta 3	LAMB3	Ğ
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta	LTBP2	G
binding protein 2	-10,4	G
Leptin	LEP	_
Leptin receptor	LEPR	G
Leukin	IV	G
LOUNIT		i

Leukocyte-specific transcript 1	LST-1	!
Leukotriene A4 hydrolase	LTA40	1
Leukotriene A4 synthase	LTA4S	E
Leukotriene B4 receptor	LTDAC	
Leukotriene B4 synthase	LTB4S	E
Leukotriene C4 receptor	LTCAC	1
Leukotriene C4 synthase Leukotriene D4/E4 receptor	LTC4S	E
LIM homeobox protein 1	LHX1	· 1
LIM-Kinase I (LINK-I)	LIIX I	G
Lipocortin 1	ANX4	1
Lipoprotein lipase	LPL	1
Lipoprotein receptor, Low Density	LDLR	Ť
Lipoprotein, High Density	HDLDT1	, T
Lipoprotein, Intermediate Density	1102011	Ť
Lipoprotein, Low Density 1		Ť
Lipoprotein, Low Density 2		Ť
Lipoprotein, Very Low Density	VLDLR .	Ť
Lipoprotein-associated coagulation factor	LACI	i
Low density lipoprotein receptor-related	LRP	Ť
protein precursor		
Lymphoid enhancer-binding factor	LEF-1	G
MAD (mothers against decapentaplegic,	MADH4	G
Drosophila) homologue 4		
Malonyl CoA decarboxylase		. Е
Mannosidase, alpha B lysosomal	MANB	Ε
Mannosidase, beta A lysosomal	MANBA	E
Methionine synthase	MTR	Ε
Methylmalonyl-CoA mutase	MUT	· E
Mevalonate kinase	MVK	E
Mismatch repair gene, PMSL2	PMS2	G
Molybdenum cofactor synthesis 1	MOCS1	·Ε
Molybdenum cofactor synthesis 2	MOCS2	E
Monoamine oxidase A Monoamine oxidase B	MAOA MAOB	E
Mucolipidoses	GNPTA	E
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Myelin basic protein		S
N-acetylglucosamine-6-sulfatase	GNS	Ē
N-acetylglucosaminidase, alpha	NAGLU	Ē
NADPH-dependent cytochrome P450	POR	Ē
reductase		_
NB6		1
Nerve growth factor	NGF	G

		•
Nerve growth factor receptor	NGFR	G
Neurite inhibitory protein		N
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68	NF68	S
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N N
Neuropeptide Y receptor Y2	NPY2R	N
Nitric oxide synthase 1, NOS1	NOS1	E
Nitric oxide synthase 2, NOS2	NOS2	E
Nitric oxide synthase 3, NOS3	NOS3	E
Notch 3	NOTCH3	G
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL	
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene bcl2	NETTO	E
Oncogene sis	PDGFB	. G
Ornithine delta-aminotransferase	OAT	G
Ornithine transcarbamoylase	OTC, NME1	E
Orthodenticle (Drosophila) homolog 1	OTX1	E
Orthodenticle (Drosophila) homolog 2	OTX1	G
Patched (Drosophila) homolog, PTCH		G
Peroxisomal membrane protein 1	PTCH	G
Peroxisomal membrane protein 3	PXMP1	S
Peroxisome biogenesis factor 1	PXMP3	T
Peroxisome biogenesis factor 19	PEX1	Ţ
Peroxisome biogenesis factor 6	PEX19	T
Peroxisome biogenesis factor 7	PEX6	T
	PEX7	T
Peroxisome receptor 1	PXR1	Ţ
Persyn .	0.51	S
Phosphoglucose isomerase	GPI	Ε
Phosphoglycerate kinase 1	PGK1	E
Phospholipase A2, group 10	PLA2G10	
Phospholipase A2, group 1B	PLA2G1B	`
Phospholipase A2, group 2A	PLA2G2A	- 1
Phospholipase A2, group 2B	PLA2G2B	1
Phospholipase A2, group 4A	PLA2G4A	1
Phospholipase A2, group 4C	PLA2G4C	1
Phospholipase A2, group 5	PLA2G5	1
Phospholipase A2, group 6	PLA2G6	1
Phospholipase C alpha		1
Phospholipase C beta		ı
Phospholipase C delta	PLCD1	İ
Phospholipase C epsilon		İ
		•

Phospholipase C gamma	PLCG1	
Phosphomannomutase 2	PMM2	1
Plasminogen		G
•	PLG	E
Plasminogen activator inhibitor 1	PAI1	E
Plasminogen activator inhibitor 2	PAI2	Ε
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	Ε
Plasminogen activator, Urokinase	UPA; PLAU	E G
Platelet derived growth factor	PDGF	
Platelet derived growth factor receptor	PDGFR	G
Platelet glycoprotein 1b, alpha	GP1BA	ı
Platelet glycoprotein 1b, beta	GP1BB	1
Platelet glycoprotein 1b, gamma	GP1BG	ŀ
Platelet glycoprotein IX	GP9	- 1
Platelet glycoprotein V	GP5	- 1
Platelet-activating factor acetylhydrolase 1B	PAFAH1B1 or	1
	LIS1	
Platelet-activating factor acetylhydrolase 2	PAFAH2	1
Platelet-activating factor receptor	PAFR	1
Plectin 1	PLEC1	Т
Polycystin 1	PKD1	Т
Polycystin 2	PKD2	Т
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium voltage-gated channel E1	KCNE1	Ν
Potassium voltage-gated channel Q1	KCNQ1	. N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	Ν
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)		
Prekallikrein		- 1
Prion protein	PRNP	N
Procollagen N-protease		Ε
Proline dehydrogenase	PRODH	Ε
Proopiomelanocortin	POMC	N
Prostacyclin synthase		1
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	i
Prostaglandin D - DP receptor		İ
Prostaglandin E1 receptor		i i
Prostaglandin E2 receptor		i
Prostaglandin E3 receptor		i
Prostaglandin F - FP receptor		i
Prostaglandin I2 receptor		Ť
Prostaglandin IP receptor		i
Protective protein for beta-galactosidase	PPGB	Ė
Protein C	PROC	_
Protein C inhibitor	PCI .	i
Protein kinase C, alpha	PRKCA	Ė
Protein kinase C, gamma	PRKCG	E
. , 3		_

Protein kinase G Protein phosphatase 1, regulatory (inhibitor)	PPP1R3	E
subunit 3		_
Protein S	PROS1	1
Prothrombin precursor	F2	İ
Purine nucleoside phosphorylase	NP	E
Pyrroline-5-carboxylate synthetase	PYCS	Ē
Pyruvate carboxylase	PC	E
Ras-G-protein	RAS	G
Renin	REN	٠Ē
Replication factor C	RFC2	E
RIGUI	RIGUI	G
S100 calcium-binding protein A1	S100A1	N
S100 calcium-binding protein A2	S100A2	N
S100 calcium-binding protein A3	S100A3	N
S100 calcium-binding protein A4	S100A4	N
S100 calcium-binding protein A5	S100A5	N
S100 calcium-binding protein A6	S100A6	N
S100 calcium-binding protein A7	S100A7	N
S100 calcium-binding protein A8	S100A8	N
S100 calcium-binding protein A9	S100A9	N
S100 calcium-binding protein B	S100B	N
S100 calcium-binding protein P	S100P	N
Secretase, alpha		N
Secretase, beta		N
Secretase, gamma		N
Selectin E	SELE	N
Selectin L	SELL	N
Selectin P	SELP	N
Serotonin N-acetyltransferase	SNAT	Ε
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1,	SCNN1G	N
gamma		

Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	N
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	T
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	Т
Solute carrier family 12, member 1	SLC12A1	Т
Solute carrier family 12, member 2	SLC12A1	
Solute carrier family 12, member 3	SLC12A2 SLC12A3	T
Solute carrier family 16 (monocarboxylate	SLC12A3 SLC16A1	T
transporter), member 1	SECTORT	T
·	SI C46A7	_
Solute carrier family 16 (monocarboxylate	SLC16A7	Т
transporter), member 7	CI C4040	_
Solute carrier family 18, member 3	SLC18A3	T
Solute carrier family 2 (facilitated glucose	SLC2A1	T
transporter), member 1		
Solute carrier family 20, member 3	SLC20A3	T
Solute carrier family 5 (sodium/glucose	SLC5A1	T
transporter), member 1		
Solute carrier family 5 (sodium/glucose	SLC5A2	T
transporter), member 2		
Solute carrier family 5 (sodium/glucose	SLC5A5	T
transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	T
Solute carrier family 6 (GAMMA-	SLC6A1	T
AMINOBUTYRIC ACID transporter), member		
1	•	
Solute carrier family 6 (neurotransmitter	SLC6A3	Ţ
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		
Solute carrier family 7(amino acid	SLC7A1	Т
transporter), member 1		•
Solute carrier family 7(amino acid	SLC7A2	Т
transporter), member 2	3.3	•
Solute carrier family 7(amino acid	SLC7A7	Т
transporter), member 7	0201717	1
Sphingomyelinase	SMPD1	E
Spinocerebellar ataxia 8 gene	SCA8	N
Steroid 5 alpha reductase 1	SRD5A1	
Steroid 5 alpha reductase 7 Steroid 5 alpha reductase 2	SRD5A1	E
Substance P	SKUSAZ	E
	soadh	N
Succinic semi-aldehyde dehydrogenase	ssadh	E
Sulfamidase	SGSH	G
Sulfite oxidase	SUOX	E
Superoxide dismutase 1	SOD1	Ε

Superoxide dismutase 3	SOD3	Ε
Surfeit 1	SURF1	G
Synapsin 1a & 1b	SYN1	N
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle amine transporter	SVAT	N
Synaptobrevin 1	SYB1	N
Synaptobrevin 2	SYB2	N
Synaptogyrin		N
Synaptophysin	SYP	N
Synaptotagmin 1	SYT1	N
Synaptotagmin 2	SYT2	N
Syntaxin 1	STX1	N
Talin	TLN	G
Tau protein	MAPT	S
TEK, tyrosine kinase, endothelial	TEK	E
Telomerase protein component	ILK	E
Thrombin receptor	F2R	-
Thrombopoietin	THPO	
Thromboxane A synthase 1	TBXAS1	G
Thromboxane A2	TXA2	1
Thromboxane A2 receptor	TBXA2R	1
Thyroxin-binding globulin	TBG	T
Topoisomerase I	160	T
Transforming growth factor, beta 2	TGFB2	E
Transforming growth factor, beta 2 Transforming growth factor, beta receptor 2	TGFBR2	G
Tuberous sclerosis 1	TSC1	G
Tuberous scierosis 2	TSC2	G
Tumour necrosis factor (TNF) receptor	TRAF1	ı
associated factor 1	TION I	
Tumour necrosis factor (TNF) receptor	TRAF2	
associated factor 2	ITOAL 2	ı
Tumour necrosis factor (TNF) receptor	TRAF3	
associated factor 3	TRAFS	ı
Tumour necrosis factor (TNF) receptor	TRAF4	
associated factor 4	110414	ı
Tumour necrosis factor (TNF) receptor	TRAF5	,
associated factor 5	INALS	1
	TRAF6	
Tumour necrosis factor (TNF) receptor associated factor 6	IRAFO	• 1
Tumour necrosis factor alpha	TNFÁ	
·		
Tumour necrosis factor alpha receptor	TNFAR	
Tumour necrosis factor beta	TNFB	!
Tumour necrosis factor beta receptor	TNFBR	ļ
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tyrosine aminotransferase	TAT	E
Tyrosine hydroxylase	TH	E
Ubiquitin	•	G

Ubiquitin B Ubiquitin C Ubiquitin carboxyl-terminal esterase L1 UDP-glucuronosyltransferase 1 UDP-glucuronosyltransferase 2 Undulin 1 Uridinediphosphate(UDP)-galactose-4-epimerase	UBB UBC UCHL1 ugt1d, UGT1 UGT2 COL14A1 GALE	GGGEESE
Uroporphyrinogen III synthase	UROS	Ε
Vacuolar proton pump, subunit 1	VPP1	Ν
Vacuolar proton pump, subunit 3	VPP3	N
Vasoactive intestinal polypeptide	VIP	Ν
Vasoactive intestinal polypeptide receptor	VIPR	N
Von Hippel-Lindau gene	VHL	G
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	G
Xanthine dehydrogenase	XDH	Ε
Zinc finger protein 2	ZIC2	S

- 141. A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 140.
- 142. A set according to claim 140 or 141 in which a minority of said probes for listed genes are absent.
- 143. A set according to claim 140 or 141 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 144. A set according to claim 140 or 141 in which a limited number of probes are replaced by probes for non-listed genes.
- 145. A set of probes for a core group of genes according to any of claims 140 to 144 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 146. A set according to any of claims 140 to 145 consisting of probes for members of a sub-group of the core group.
- 147. A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 148. A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.

- 149. A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 150. A set according to claim 147 or 148 in which said substrate is a semiconductor microchip.
- 151. A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 152. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 153. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 154. A medical device including a set according to any of claims 140 to 152 for use in an array for detection of differential gene expression levels.
- 155. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 140) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 140 and 142 to 152 and relating the probe hybridisation pattern to said variations.
- 156. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 141) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 141 to 152 and relating the probe interaction pattern to said variations.
- 157. Use of a set or device according to any of claims 140 to 152 for the prognosis and management of patients suffering from or at risk of clinical, psychological and social consequences of brain injury.
- 158. Use of a set or device according to any of claims 140 to 152 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 159. Use of a set or device according to any of claims 140 to 152 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 160. Use of a set or device according to any of claims 140 to 152 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 161. Use of a set or device according to any of claims 140 to 152 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 162. Use of a set or device according to any of claims 140 to 152 for the development of new strategies of therapeutic intervention and in clinical trials.
- 163. Use of a set or device according to any of claims 140 to 152 for construction of and generation of algorithms for patient and healthcare management.
- 164. Use of a set or device according to any of claims 140 to 152 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations

- 165. Use of a set or device according to any of claims 140 to 152 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 166. Use of a set or device according to any of claims 140 to 152 for predicting optimum configuration/management of thereapeutic intervention.
- 167. A method according to claim 155 or 156 in which the identification of gene variants is indicative of a higher risk of developing clinical, psychological and social consequences of brain injury for the patient or individual.
- 168. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop clinical, psychological and social consequences of brain injury, which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from clinical, psychological and social consequences of brain injury;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the clinical, psychological and social consequences of brain injury;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 140 to 146;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing clinical, psychological and social consequences of brain injury.
- 169. A method for assessing whether a given subject will be at risk of developing clinical, psychological and social consequences of brain injury, which comprises comparing said subject's genotype with a model generated by the method of claim 168.
- 170. A method according to any of claims 155, 156, 168 and 169 wherein at least one step is computer-controlled.
- 171. An assay suitable for use in a method according to any of claims 155, 156, 168 and 169; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 140 to 146 in a biological sample.
- 172. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing clinical, psychological and social consequences of brain injury; said kit comprising:
 - means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 140 or 142 to 146 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - readout indicating the probability of a patient or individual developing clinical, psychological and social consequences of brain injury.
- 173. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing clinical, psychological and social consequences of brain injury; said kit comprising:

- means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 141 to 146 in an expressedprotein-containing human sample;
- ii) reagents for use in the detection process
- readout indicating the probability of a patient or individual developing clinical, psychological and social consequences of brain injury.
- 174. A set of probes according to claim 140, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 175.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to dementia and/or its associated symptoms; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

DEMENTIA GENE LIST	HUGO gene symbol	Protein function
2,3-bisphosphoglycerate mutase	BPGM	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	Ē
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	Ē
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	Ň
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	Ē

Adducin, alpha Adducin, beta Adenosine receptor A1 Adenosine receptor A2B Adenosine receptor A3 Adenosine receptor A3 Adenylate cyclase 1 Adenylate cyclase 2 Adenylate cyclase 3 Adenylate cyclase 4 Adenylate cyclase 5 Adenylate cyclase 6 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 9 Adrenergic receptor, alpha1 Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH)	ADD1 ADD2 ADORA1 ADORA2A ADORA2B ADORA3 ADCY1 ADCY2 ADCY3 ADCY4 ADCY5 ADCY6 ADCY7 ADCY8 ADCY7 ADCY8 ADCY9 ADRA1 ADRA2 ADRA1 ADRA2 ADRB1 ADRB2 ADRB3 ACTHR	002222888888888888888888888888888888888
receptor Albumin, ALB	ALB	Т
Aldosterone receptor	MLR	G
Alpha 2 macroglobulin	A2M	1
alpha1-antitrypsin	PI	Ε
alpha2-antiplasmin	PLI	Ε
alpha-synuclein	SNCA	Ν
Aminopeptidase P	XPNPEP2	Ε
Amyloid beta (A4) precursor protein-binding,	APBB1	Ν
APBB1		
Amyloid beta A4 precursor protein	APP	N
Amyloid beta A4 precursor-like protein	APLP	N
Angiopoietin 1 Angiopoietin 2	ANGPT1 ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	G
Angiotensin receptor 1	AGTR1	E
Angiotensin receptor 2	AGTR2	Ť
Angiotensinogen	AGT	Ė
Antidiuretic hormone receptor	ADHR	T
Antithrombin III	AT3	Ė
Apolipoprotein A I	APOA1	Ť
Apolipoprotein A II	APOA2	Ť
Apolipoprotein B	APOB	Ť
Apolipoprotein C1	APOC1	Т
Apolipoprotein C2	APOC2	T
Apolipoprotein C3	APOC3	Т
Apolipoprotein D	APOD	T

Apolipoprotein E	APOE	Т
Apolipoprotein H	APOH	Ť
Apoptosis antigen 1	APT1	
Arginase	ARG1	E
Arginine vasopressin	AVP	N
Arginine vasopressin receptor 1A	AVPR1A	
Arginine vasopressin receptor 1B	AVPR1B	N
Arginine vasopressin receptor 2	AVPR2	N
Arginosuccinate lyase	ASL	N
Arginosuccinate synthetase	ASS	Ε
Ataxia telangiectasia gene, AT	ATM	E
ATP/ADP translocase	ATIVI	G
Atrial natriuretic peptide	ANP	E
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B		G
Atrial natriuretic peptide receptor C	NPR2	G
· · · · · · · · · · · · · · · · · · ·	NPR3	G
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	G
beta-synuclein	SNCB	Ν
Bleomycin hydrolase	BLMH	Ε
Bradykinin receptor B1		1
Bradykinin receptor B2		1
Brain derived neurotrophic factor	BDNF	G
Brain derived neurotrophic factor (BDNF)	BDNFR	G
receptor		
Butyrylcholinesterase	BCHE	Ε
Cadherin E	CDH1	G
Cadherin EP		G
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	ı
Calcineurin A2	CALNA2	1
Calcineurin A3	CALNA3	1
Calcineurin B		1
Calcitonin/Calcitonin gene-related peptide	CALCA	Ν
alpha	•	
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	N.
subunit		
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		•
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C		•
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N
1D		14
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)		1.4
Calcium channel, voltage-dependent, Alpha-	CACNA2	NI
remage depondent, rupila-	J. 1011/12	Ν

2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	
Calcium channel, voltage-dependent, Beta 3	CACNB3	N
Calcium channel, voltage-dependent, L type,	CACNA1S	N
alpha 1S subunit	CACNATS	N
Calcium channel, voltage-dependent,	CACNG2	• •
Neuronal, Gamma	CACINGZ	N
Calcium channel, voltage-dependent, P/Q	CACNA1A	
type, alpha 1A subunit	CACNATA	N
Calcium channel, voltage-dependent, T-type		
Calmodulin 1	CALAM	N
Calmodulin 2	CALM1	G
	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CAMK2A	G
Calnexin	CANX	G
Calpain	CAPN, CAPN3	Ε
Calretinin	CALB2	N
Carbonic anhydrase 3	CA3	Ε
Carbonic anhydrase 4	CA4	Ε
Carbonic anhydrase, alpha	CA1	Ε
Carbonic anhydrase, beta	CA2	. Е
Cardiac-specific homeobox, CSX	CSX	G
Caspase 1	CASP1	G
Caspase 10	CASP10	G
Caspase 2	CASP2	G
Caspase 3	CASP3	G
Caspase 4	CASP4	G
Caspase 5	CASP5	G
Caspase 6	CASP6	G
Caspase 7	CASP7	G
Caspase 8	CASP8	G
Caspase 9	CASP9	G
Catechol-O-methyltransferase	COMT	Ε
CD1	CD1	ı
CD4	CD4	i
Cell adhesion molecule, intercellular, ICAM	ICAM1	G
Cell adhesion molecule, leukocyte-endothelial,	LECAM1	G
LECAM (CD62)	e produktiva de la composition de la composition de la composition de la composition de la composition de la c	• ••
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	PECAM1	· G
PECAM	•	
Cell adhesion molecule, vascular, VCAM	VCAM1	G
Chemokine receptor CXCR4	CXCR4	Ī
Choline acetyltransferase	CHAT	Ė
Chymotrypsinogen		E
		L

Cockayne syndrome gene, CKN1 Cofilin	CKN1	G
Collagen I alpha 1	001.444	S
Collagen I alpha 2	COL1A1	S
	COL1A2	S
Collagen III alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	S
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	S
Collagen IV alpha 6	COL4A6	S
Collagen IX alpha 2	COL9A2, EDM2	S
Collagen IX alpha 3	COL9A3	S S
Collagen receptor	COLR	S
Collagen V alpha 1	COL5A1	S
Collagen V alpha 2	COL5A2	S
Collagen VI alpha 1	COL6A1	9
Collagen VI alpha 2	COL6A2	9
Collagen VI alpha 3	COL6A3	ى د
Collagen VII alpha 1	COL7A1	ى د
Collagen X alpha 1	COL10A1	\$ \$ \$ \$
Collagen X alpha 1	COL11A1	5
Collagen XI alpha 2	COLTIAT COL11A2	S
Collagen XVII alpha 1		S
Corticotrophin-releasing hormone	COL17A1	S
Corticotrophin-releasing hormone receptor	CRH CRUP4	Ţ
Cu2+ transporting ATPase beta polypeptide	CRHR1	Ţ
	ATP7B	E
Cyclic AMP-dependent protein kinase	PKA	E
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	Ε
Cyclic nucleotide phosphodiesterase 3B	PDE3B	E
Cyclic nucleotide phosphodiesterase 4A	PDE4A	Ε
Cyclic nucleotide phosphodiesterase 4C	PDE4C	Ε
Cyclic nucleotide phosphodiesterase 5A	PDE5A	Е
Cyclic nucleotide phosphodiesterase 6A	PDE6A	E
Cyclic nucleotide phosphodiesterase 6B	PDE6B	Ε
Cyclic nucleotide phosphodiesterase 7	PDE7	· · E
Cyclic nucleotide phosphodiesterase 8	PDE8	Е
Cyclic nucleotide phosphodiesterase 9A	PDE9A	Ε
Cyclooxygenase 1	COX1	Ē
Cyclooxygenase 2	COX2	Ē
CYP11A1	CYP11A1	Ē
CYP11B1	CYP11B1	Ē
CYP11B2	CYP11B2	E
CYP17	CYP17	E
CYP19	CYP19	E
CYP1A1	CYP1A1	E
•	OH IAI	

•		
CYP1A2	CYP1A2	Ε
CYP1B1	CYP1B1	E
CYP21	CYP21	Ē
CYP24	CYP24	Ē
CYP27	CYP27	E
CYP27B1	PDDR	Ē
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	E
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A7	E
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	E
CYP2C19	CYP2C19	E
CYP2C8	CYP2C8	E
CYP2C9	CYP2C9	
CYP2D6	CYP2D6	E
CYP2E1	CYP2E1	E
CYP2F1	CYP2F1	E
CYP2J2		
CYP3A3	CYP2J2 CYP3A3	E
CYP3A4	CYP3A4	E
CYP3A5	CYP3A5	E
CYP3A7		E
CYP4A11	CYP3A7	E
CYP4B1	CYP4A11	E
CYP4F2	CYP4B1	E
CYP4F3	CYP4F2	E
CYP51	CYP4F3	E
CYP5A1	CYP51	E
CYP7A	CYP5A1	E
CYP8	CYP7A	E
	CYP8	E
Cystathione beta synthase	CBS	E
Cystatin C	CST3	T
Cystinosin	CTNS	T
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytochrome a	0)/5.4	E
Cytochrome b-245 alpha	CYBA * ****	E.
Cytochrome b-245 beta	CYBB	E
Cytochrome c		Е
Cytochrome c oxidase, MTCO	51.57	E
Dihydrolipoyl succinyltransferase	DLST	E
Dopamine beta hydroxylase	DBH	Ε
Dopamine receptors D1	DRD1	Ν
Dopamine receptors D2	DRD2	Ν
Dopamine receptors D3	DRD3	Ν
Dopamine receptors D4	DRD4	Ν
Dopamine receptors D5	DRD5	Ν

Doublecortin, DCX Emerin Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Enolase Epidermal growth factor Epidermal growth factor receptor Epilepsy, progressive myoclonic 2 gene Excision repair complementation group 4 protein	DCX EMD EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB ENO1 EGF EGFR EPM2A ERCC4	STXXXXXEGGEE
Factor 1 (No. one)	F1	1
Factor III	F3	i
Factor IX	F9	i
Factor V	F5	i
Factor VII	F7	İ
Factor VIII	F8	. 1
Factor X	F10	1
Factor XI	F11	1
Factor XII	F12	1
Factor XIII A & B	F13A & F13B	1
Fanconi anemia, complementation group A	FANCA	Ţ
Fibringen lete	FGA	S
Fibrinogen beta Fibrinogen gamma	FGB	S
Fibriogen gamma Fibroblast growth factor	FGG FGE1	S
Fibroblast growth factor receptor 1	FGF1 FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G G
Fibronectin precursor	FN1	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
GABA receptor, alpha 1	GABRA1	N
GABA receptor, alpha 2	GABRA2	N
GABA receptor, alpha 3	GABRA3	· N
GABA receptor, alpha 4	GABRA4	N N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	N
GABA receptor, beta 1	GABRB1	N
GABA receptor, beta 2	GABRB2	N
GABA receptor, beta 3	GABRB3	· N
GABA receptor, gamma 1	GABRG1	N
GABA receptor, gamma 2	GABRG2	N
GABA receptor, gamma 3	GABRG3	N
GABA transaminase	ABAT	Ε

Galactosyltransferase 1 Galactosyltransferase, alpha 1,3 Galactosyltransferase, beta 3 Gastric Intrinsic factor, GIF Glial-cell derived neurotrophic factor (GDNF) receptor	GT1 GGTA1 B3GALT GIF	G G E N
Glial-cell derived neurotrophic factor, GDNF	GDNF	Ň
Glutamate decarboxylase, GAD	GAD1	E
Glutamate receptor 1	GLUR1	N
Glutamate receptor 2	GLUR2	N
Glutamate receptor 3	GLUR3	N
Glutamate receptor 4	GLUR4	N
Glutamate receptor 5	GLUR5	N
Glutamate receptor 6	GLUR6	N
Glutamate receptor 7	GLUR7	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	. N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	, N
Glutaryl-CoA dehydrogenase Glutathione	GCDH	E
	GSH CST74	T
Glutathione S-transferase, GSTZ1	GSTZ1	E
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	E
Glycerol kinase	GK	
Glycinamide ribonucleotide (GAR)	GART	E E
transformylase	OAITI	
Gonadotropin releasing hormone receptor	GNRHR	G
Guanylyl cyclase		E
Haemoglobin alpha 1	HBA1	T
Haemoglobin alpha 2	HBA2	. Ť
Haemoglobin beta	HBB	Ť
Haemoglobin delta	HBD	Ť
Haemoglobin gamma A	HBG1	Ť
Haemoglobin gamma B	HBG2	Ť
Haemoglobin gamma G	HBGG	Ť
Heparan sulfamidase	•••	· Е
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	1
Hepatic lipase	LIPC	Ε
Hexosaminidase A	HEXA,TSD	E
Hexosaminidase B	HEXB	Е
Hippocampal cholinergic neurostimulating pept	ide, HCNP	N
Histamine receptors, H1		N
Histamine receptors, H2		N
Histamine receptors, H3		N
Histidase		F

HLA-B associated transcript 1	BAT1	1
HMG-CoA reductase	HMGCR	1
Holocarboxylase synthetase	HLCS	E
Hypoxia inducible factor 1	HIF1A	E
Hypoxia inducible factor 2		E
IC7 A and B		E
Inositol monophosphatase	IMPA1	l Nt
Insulin	INS	N
Insulin receptor	INSR	G G
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 3	ITGB3	G
Integrin beta 4	ITGB4	G
Integrin beta 5	ITGB5	· G
Integrin beta 6	ITGB6	G
Integrin beta 7	ITGB7	G
Integrin, alpha 1	ITGA1	G
Integrin, alpha 2	ITGA2	G
Integrin, alpha 3	ITGA3	G
Integrin, alpha 4	ITGA4	G
Integrin, alpha 5	ITGA5	G
Integrin, alpha 6	ITGA6	Ğ
Integrin, alpha 7	ITGA7	Ğ
Integrin, alpha 8	ITGA8	G
Integrin, alpha 9	ITGA9	Ğ
Integrin, alpha M	ITGAM	Ğ
Integrin, alpha X	ITGAX	Ğ
Interleukin(IL) 1 receptor	IL1R	Ĩ
Interleukin(IL) 1, alpha	IL1A	i
Interleukin(IL) 1, beta	IL1B	i
Interleukin(IL) 10	IL10	i
Interleukin(IL) 10 receptor	IL10R	ĺ
Interleukin(IL) 11	IL11	ĺ
Interleukin(IL) 11 receptor	IL11R	· · · · · · · · · · · · · · · · · · ·
Interleukin(IL) 12	IL12	i
Interleukin(IL) 12 receptor, beta 1	IL12RB1	ĺ
Interleukin(IL) 13	IL13	i
Interleukin(IL) 13 receptor	IL13R	ĺ
Interleukin(IL) 2	IL2	·
Interleukin(IL) 2 receptor, alpha	IL2RA	Ì
Interleukin(IL) 2 receptor, gamma	IL2RG	ĺ
Interleukin(IL) 3	IL3	i
Interleukin(IL) 3 receptor	IL3R	i
Interleukin(IL) 4	IL4	i
Interleukin(IL) 4 receptor	IL4R	ĺ
Interleukin(IL) 5	IL5	i
Interleukin(IL) 5 receptor	IL5R	ı
Interleukin(IL) 6	IL6	ĺ

Interleukin(IL) 6 receptor	IL6R	ľ
Interleukin(IL) 7	IL7	1
Interleukin(IL) 7 receptor	IL7R	- 1
Interleukin(IL) 8	IL8	ı
Interleukin(IL) 8 receptor	IL8R	ı
Interleukin(IL) 9	IL9	İ
Interleukin(IL) 9 receptor	IL9R	1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	i
IP3 kinase	• • •	Ė
Kallikrein 3	KAK3	Ī
Kininogen, High molecular weight	KNG	i
Kynureninease		Ė
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta binding	LTBP2	G
protein 2	,	0
Leptin	LEP	G
Leptin receptor	LEPR	G
Leukin		ï
Leukocyte-specific transcript 1	LST-1	1
Leukotriene A4 hydrolase	20	1
Leukotriene A4 synthase	LTA4S	Ė
Leukotriene B4 receptor	217(40	ī
Leukotriene B4 synthase	LTB4S	Ė
Leukotriene C4 receptor	21373	Ī
Leukotriene C4 synthase	LTC4S	Ė
Leukotriene D4/E4 receptor	21010	ī
LIM homeobox protein 1	LHX1	Ġ
LIM-Kinase I (LINK-I)		1
Lipoprotein receptor, Low Density	LDLR	Ť
Lipoprotein, High Density	HDLDT1	Ť
Lipoprotein, Intermediate Density	NOLD 11	÷
Lipoprotein, Low Density 1		Ť
Lipoprotein, Low Density 2		Ť
Lipoprotein, Very Low Density	VLDLR	<u>'</u>
Low density lipoprotein receptor-related protein		Ť
precursor	LIVI	•
Lymphoid enhancer-binding factor	LEF-1	G
MAD (mothers against decapentaplegic,	MADH4	G G
Drosophila) homologue 4	WADITA	G
Mannosidase, alpha B lysosomal	MANB	_
Mannosidase, alpha b fysosomal	MANBA	Ε
Methionine synthase	MTR	Ε
Mismatch repair gene, PMSL2	PMS2	E
Molybdenum cofactor synthesis 1		G
Molybushum colaciol symmesis i	MOCS1	Ε

Molybdenum cofactor synthesis 2	MOCS2	E
Monoamine oxidase A	MAOA	E
Monoamine oxidase B	MAOB	Ē
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Myelin basic protein		S
N-acetylglucosamine-6-sulfatase	GNS	Ě
N-acetylglucosaminidase, alpha	ŅAGLU	E
NADPH-dependent cytochrome P450	POR	Ε
reductase		
NB6		1
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neurite inhibitory protein		N
Neuroendocrine convertase 1	NEC1, PCSK1	Ε
Neurofibromin 1	NF1	. G
Neurofibromin 2	NF2	G
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68	NF68	\$
Neurokinin A	NKNA	· N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Nitric oxide synthase 1, NOS1	NOS1	Ε
Nitric oxide synthase 2, NOS2	NOS2	E
Nitric oxide synthase 3, NOS3 Notch 3	NOS3	E
	NOTCH3	G
Nuclear factor I-kappa-B-like gene	IKBL	<u> </u>
Nucleoside diphosphate kinase-A Oncogene bcl2	NDPKA	E
Oncogene sis	DDOED	G
Ornithine delta-aminotransferase	PDGFB	G
Ornithine della-aminotransierase Ornithine transcarbamoylase	OAT NIME	E
Parkin	OTC, NME1	E
Persyn	PARK2	N
Phosphoglucose isomerase	CDI	S
Phosphoglycerate kinase 1	GPI BCK1	E
Phospholipase A2, group 10	PGK1	E
Phospholipase A2, group 1B	PLA2G10	!
Phospholipase A2, group 2A	PLA2G1B	!
Phospholipase A2, group 2B	PLA2G2A PLA2G2B	!
Phospholipase A2, group 4A	PLA2G2B PLA2G4A	!
Phospholipase A2, group 4C	PLA2G4A PLA2G4C	
· ····································	FLAZG4C	I

Phospholipase A2, group 5 Phospholipase A2, group 6 Phospholipase C alpha Phospholipase C beta Phospholipase C delta Phospholipase C epsilon Phospholipase C gamma Plasminogen Plasminogen activator inhibitor 1	PLA2G5 PLA2G6 PLCD1 PLCG1 PLG PAI1	
Plasminogen activator inhibitor 2	PAI2	E
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	Ε
Plasminogen activator, Urokinase	UPA; PLAU	Ε
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Platelet-activating factor receptor	PAFR	1
Postsynaptic density-95 protein	PSD95	N
Potassium inwardly-rectifying channel J1 Potassium voltage-gated channel E1	KCNJ1 KCNE1	N
Potassium voltage-gated channel Q1	KCNQ1	N
POU domain, class 1, transcription factor 1	POU1F1	N G
(Pit1)	1 30 // 1	G
Prekallikrein		1
Presenilin 1	PSEN1	Ť
Presenilin 2	PSEN2	Ť
Prion protein	PRNP	Ν
Procollagen N-protease		Ε
Proopiomelanocortin	POMC	Ν
Prostacyclin synthase		1
Prostaglandin 15-OH dehydrogenase Prostaglandin D - DP receptor Prostaglandin E1 receptor	HGPD; PGDH]
Prostaglandin E2 receptor Prostaglandin E3 receptor		1
Prostaglandin F - FP receptor Prostaglandin I2 receptor Prostaglandin IP receptor		T I
Protective protein for beta-galactosidase	PPGB	·Ε
Protein C	PROC	1.
Protein C inhibitor	PCI	1
Protein kinase C, alpha	PRKCA	E.
Protein kinase C, gamma	PRKCG	E
Protein kinase G		Ε
Protein phosphatase 1, regulatory (inhibitor) subunit 3	PPP1R3	Ε
Protein S	PROS1	1
Prothrombin precursor	F2	
Purine nucleoside phosphorylase	NP	Ε

Pyruvate carboxylase	DO.	
Renin	PC	Ε
Replication factor C	REN	E
RIGUI	RFC2	Ε
	RIGUI	G
S100 calcium-binding protein A1	S100A1	N
S100 calcium-binding protein A2	\$100A2	Ν
S100 calcium-binding protein A3	S100A3	Ν
S100 calcium-binding protein A4	S100A4	Ν
S100 calcium-binding protein A5	S100A5	Ν
S100 calcium-binding protein A6	S100A6	N
S100 calcium-binding protein A7	S100A7	Ν
S100 calcium-binding protein A8	S100A8	Ν
S100 calcium-binding protein A9	S100A9	Ν
S100 calcium-binding protein B	S100B	Ν
S100 calcium-binding protein P	S100P	N
Secretase, alpha		N
Secretase, beta	,	N
Secretase, gamma		N
Selectin E	SELE	N
Selectin L	SELL	N
Selectin P	SELP	N
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N.
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	CONNAD	N
Sodium channel, non-voltage gated 1, gamma	SCNN1B	N-
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide	SCIVIB	Ν
Solute carrier family 1 (glutamate transporter),	S1 C4 A 4	_
member 1	SLC1A1	·T
	Ci C4AO	_
Solute carrier family 1 (glutamate transporter), member 2	SLUTAZ	Т
Solute carrier family 12, member 1	SI C1244	_
Solute carrier family 12, member 1	SLC12A1	T
Solute carrier family 12, member 2	SLC12A2	Т
Colucte carrier farming 12. Member 3	SLC12A3	Т

Solute carrier family 18, member 3	SLC18A3	т
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	Т
Solute carrier family 5 (sodium/glucose	SLC5A2	T
transporter), member 2	SLOJAZ	T
Solute carrier family 5 (sodium/glucose	SLC5A5	т
transporter), member 5		'
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ACID transporter), membe	er 1	
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2	01.004.4	
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	Т
Sphingomyelinase	SMPD1	- -
Substance P	SIVIPUI	E
Succinic semi-aldehyde dehydrogenase	ssadh	N E
Sulfite oxidase	SUOX	E .
Superoxide dismutase 1	SOD1	. E
Superoxide dismutase 3	SOD3	Ē
Surfeit 1	SURF1	Ğ
Synaptogyrin		N
Synaptophysin	SYP	N
Syntaxin 1	STX1	N
Talin	TLN	G
Tau protein	MAPT	S
TEK, tyrosine kinase, endothelial	TEK	E
Telomerase protein component Thrombin receptor	EOD	E
Thrombopoietin	F2R THPO	
Thromboxane A synthase 1	TBXAS1	.G
Topoisomerase I	IDAAGI	I E
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Tumour necrosis factor (TNF) receptor	TRAF1	· 1
associated factor 1		or the second second
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3		\
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4	TDACC	
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	1
Tumour necrosis factor (TNF) receptor	TRAF6	1
associated factor 6	INAFO	
according indict o		

Tumour necrosis factor alpha Tumour necrosis factor alpha receptor Tumour necrosis factor beta Tumour necrosis factor beta receptor Tumour protein p53 Tumour protein p63 Tyrosine aminotransferase Tyrosine hydroxylase Ubiquitin	TNFA TNFAR TNFB TNFBR TP53, P53 TP63 TAT TH	G G E E C
Ubiquitin B Ubiquitin C Ubiquitin carboxyl-terminal esterase L1 UDP-glucuronosyltransferase 1 UDP-glucuronosyltransferase 2 Uridinediphosphate(UDP)-galactose-4-epimerase	UBB UBC UCHL1 ugt1d, UGT1 UGT2 GALE	G G G E E E
Uroporphyrinogen III synthase Vacuolar proton pump, subunit 1 Vacuolar proton pump, subunit 3 Vasoactive intestinal polypeptide Vasoactive intestinal polypeptide receptor Xanthine dehydrogenase	UROS VPP1 VPP3 VIP VIPR XDH	E N N N N

- 176.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 175.
- 177.A set according to claim 175 or 176 in which a minority of said probes for listed genes are absent.
- 178.A set according to claim 175 or 176 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 179.A set according to claim 175 or 176 in which a limited number of probes are replaced by probes for non-listed genes.
- 180.A set of probes for a core group of genes according to any of claims 175 to 179 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 181.A set according to any of claims 175 to 180 consisting of probes for members of a sub-group of the core group.

- 182.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 183.A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 184.A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 185.A set according to claim 182 or 183 in which said substrate is a semiconductor microchip.
- 186.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 187. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 188. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 189.A medical device including a set according to any of claims 175 to 187 for use in an array for detection of differential gene expression levels.
- 190. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 175) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 175 and 177 to 187 and relating the probe hybridisation pattern to said variations.
- 191. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 176) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 176 to 187 and relating the probe interaction pattern to said variations.
- 192. Use of a set or device according to any of claims 175 to 187 for the prognosis and management of patients suffering from or at risk of dementia and/or its associated symptoms.
- 193. Use of a set or device according to any of claims 175 to 187 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 194. Use of a set or device according to any of claims 175 to 187 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 195. Use of a set or device according to any of claims 175 to 187 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 196. Use of a set or device according to any of claims 175 to 187 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 197. Use of a set or device according to any of claims 175 to 187 for the development of new strategies of therapeutic intervention and in clinical trials.
- 198. Use of a set or device according to any of claims 175 to 187 for construction of and generation of algorithms for patient and healthcare management.
- 199. Use of a set or device according to any of claims 175 to 187 for modelling or

- assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 200. Use of a set or device according to any of claims 175 to 187 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 201. Use of a set or device according to any of claims 175 to 187 for predicting optimum configuration/management of thereapeutic intervention.
- 202.A method according to claim 190 or 191 in which the identification of gene variants is indicative of a higher risk of developing dementia and/or its associated symptoms for the patient or individual.
- 203. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop dementia and/or its associated symptoms, which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from dementia and/or its associated symptoms;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the dementia and/or its associated symptoms;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 175 to 181;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing dementia and/or its associated symptoms.
- 204. A method for assessing whether a given subject will be at risk of developing dementia and/or its associated symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 203.
- 205. A method according to any of claims 190, 191, 203 and 204 wherein at least one step is computer-controlled.
- 206. An assay suitable for use in a method according to any of claims 190, 191, 203 and 204; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 175 to 181 in a biological sample.
- 207. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing dementia and/or its associated symptoms; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 175 or 177 to 181 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing dementia and/or its associated symptoms.
- 208. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing dementia and/or its associated symptoms; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core

- group of genes as defined in any of claims 176 to 181 in an expressed-protein-containing human sample;
- ii) reagents for use in the detection process
- readout indicating the probability of a patient or individual developing dementia and/or its associated symptoms.
- 209. A set of probes according to claim 175, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 210.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to psychotic disorders and disorders of personality; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

PSYCHOSES & PERSONALITY GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	E
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	Ē
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	Ň
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	Ñ
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	Ë
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A	ADORA2A	N

Adenosine receptor A2B	ADORA2B	N
Adenosine receptor A3	ADORA3	N
Adenylate cyclase 1	ADCY1	Ë
Adenylate cyclase 2	ADCY2	Ē
Adenylate cyclase 3	ADCY3	E
Adenylate cyclase 4	ADCY4	Ē
Adenylate cyclase 5	ADCY5	E
Adenylate cyclase 6	ADCY6	Ē
Adenylate cyclase 7	ADCY7	E
Adenylate cyclase 8	ADCY8	Ē
Adenylate cyclase 9	ADCY9	E
Adenylosuccinate lyase	ADSL	E
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N
Adrenocorticotrophic hormone (ACTH)	ACTHR	G
receptor		J
Albumin, ALB	ALB	Т
alpha1-antichymotrypsin	AACT	Ė
alpha-synuclein	SNCA	N
Amyloid beta A4 precursor protein	APP	N
Amyloid beta A4 precursor-like protein	APLP	N
Apolipoprotein A I	APOA1	Ť
Apolipoprotein A II	APOA2	Ť
Apolipoprotein B	APOB	Ť
Apolipoprotein C1	APOC1	Ť
Apolipoprotein C2	APOC2	Ť
Apolipoprotein C3	APOC3	Ť
Apolipoprotein D	APOD	Ť
Apolipoprotein E	APOE	Ť
Apolipoprotein H	APOH	Ť
Arginosuccinate synthetase	ASS	Ē
Arylsulfatase A	ARSA	Ē
Ataxia telangiectasia gene, AT	ATM	Ğ
ATP/ADP translocase		Ë
Atrial natriuretic peptide	ANP	Ğ
Atrial natriuretic peptide receptor A	NPR1	Ğ
Atrial natriuretic peptide receptor B	NPR2	Ğ
Atrial natriuretic peptide receptor C	NPR3	Ğ
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	Ğ
beta-synuclein	SNCB	N
Brain derived neurotrophic factor	BDNF	G
Brain derived neurotrophic factor (BDNF)	BDNFR	G
receptor		J
C1 inhibitor		E
Ca(2+) transporting ATPase, slow twitch	ATP2A2	T
		•

Calbindin 1	CALB1	G
Calbindin D9K.	CALB3	G
Calcineurin A1	CALNA1	1
Calcineurin A2	CALNA2	١
Calcineurin A3	CALNA3	i
Calcineurin B		i
Calcitonin/Calcitonin gene-related peptide	CALCA	Ň
alpha		
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	Ν
subunit		14
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		14
	CACNA1C	N
1C	3/13/1/13	IA
Calcium channel, voltage-dependent, Alpha-	CACNA1D	N.I
1D	CHAID	Ν
Calcium channel, voltage-dependent, Alpha-	CACNA1E	K I
1E (CACNL1A6)	CACINATE	Ν
Calcium channel, voltage-dependent, Alpha-	CACNA2	K I
2/delta	CACINAZ	Ν
Calcium channel, voltage-dependent, Beta 1	CACNB1	
Calcium channel, voltage-dependent, Beta 3	CACNB1	N
Calcium channel, voltage-dependent, Beta 3	CACNG2	N
Neuronal, Gamma	CACNG2	N
Calcium channel, voltage-dependent, T-type		
Calcium channer, voltage-dependent, 1-type Calmodulin 1	CALNA	N
Calmodulin 2	CALM1	G
	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CAMK2A	G
Calnexin	CARN	G
Calpain	CAPN, CAPN3	Ε
Calretinin	CALB2	N
Cannabinoid receptor	CNR1	Ν
Carbonic anhydrase 3	CA3	Ε
Carbonic anhydrase 4	CA4	Ε
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	Ε
Cardiac-specific homeobox, CSX	CSX:	G
Caspase 1	CASP1	G
Catechol-O-methyltransferase	COMT	Ε
Ceroid lipofuscinosis neuronal 2	CLN2	Ν
Ceroid lipofuscinosis neuronal 3	CLN3	Ν
Ceroid lipofuscinosis neuronal 4	CLN4	N
Ceroid lipofuscinosis neuronal 5	CLN5	Ν
Ceroid lipofuscinosis neuronal 6	CLN6	Ν
Chemokine receptor CCR5	CCR5	1
Chemokine receptor CXCR4	CXCR4	ľ
Cholecystokinin	CCK	Ν

Cholecystokinin B receptor	CCKBR -		N
Choline acetyltransferase	CHAT		
Chymotrypsinogen	O. 1.7 (1		E
Ciliary neurotrophic factor (CNTF)	CNTF		E
Ciliary neurotrophic factor (CNTF) receptor	CNTFR		G
Citrate synthase	CIVITIX		G
Colony-stimulating factor 2	CSF2		E
Colony-stimulating factor 2 alpha receptor	CSF2RA		G
Corticotrophin-releasing hormone			٠G
Corticotrophin-releasing hormone receptor	CRH		Т
Cu2+ transporting ATPase beta polypeptide	CRHR1		Т
Cyclic AMP response element hinding and in	ATP7B		Ε
Cyclic AMP dependent protein	CREB		G
Cyclic AMP-dependent protein kinase	PKA		Ε
Cyclic nucleotide phosphodiesterase 1B	PDE1B	•	Ε
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1		Ε
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3		Ε
Cyclic nucleotide phosphodiesterase 3A	PDE3A		E
Cyclic nucleotide phosphodiesterase 3B	PDE3B	•	Ε
Cyclic nucleotide phosphodiesterase 4A	PDE4A		E
Cyclic nucleotide phosphodiesterase 4C	PDE4C		Ε
Cyclic nucleotide phosphodiesterase 5A	PDE5A		Ε
Cyclic nucleotide phosphodiesterase 6A	PDE6A		E
Cyclic nucleotide phosphodiesterase 6B	PDE6B		Ε
Cyclic nucleotide phosphodiesterase 7	PDE7		E
Cyclic nucleotide phosphodiesterase 8	PDE8		Ε
Cyclic nucleotide phosphodiesterase 9A	PDE9A		Ε
Cyclooxygenase 1	COX1		E
Cyclooxygenase 2	COX2		Ε
CYP11A1	CYP11A1		Ε
CYP11B1	CYP11B1		E
CYP11B2	CYP11B2		Ε
CYP17	CYP17		Ε
CYP19	CYP19		E
CYP1A1	CYP1A1		E
CYP1A2	CYP1A2		E
CYP1B1	CYP1B1		Ē
CYP21	CYP21		E
0) (50.4	CYP24		E
0)/00=	CYP27	•	Ē
5\ ·	PDDR		Ē
0) (50.4.4	CYP2A1	•	E
A	CYP2A13		E
O) (DO) 0	CYP2A3		E
0) (50) 0) (6	CYP2A6V2		E
0.4504.7	CYP2A7		
	CYP2B6		E
0)/00040	CYP2C18		E
0.450	CYP2C19		E
	0172019		Е

CYP2C8	CYP2C8		Е
CYP2C9	CYP2C9		E
CYP2D6	CYP2D6		E
CYP2E1	CYP2E1		E
CYP2F1	CYP2F1		E
CYP2J2	CYP2J2		E
CYP3A3	CYP3A3		E
CYP3A4	CYP3A4		E
CYP3A5	CYP3A5		E
CYP3A7	CYP3A7		Ē
CYP4A11	CYP4A11		E
CYP4B1	CYP4B1		Ē
CYP4F2	CYP4F2		Ē
CYP4F3	CYP4F3		E
CYP51	CYP51		Ē
CYP5A1	CYP5A1		Ē
CYP7A	CYP7A		Ē
CYP8	CYP8		E
Cystathionase	CTH	•	E E
Cystathione beta synthase	CBS		Ē
Cytidine deaminase	CDA	•	Ē
Cytidine-5-prime-triphosphate synthetase	CTPS		Ē
Cytochrome a			E
Cytochrome c			Ē
Cytochrome c oxidase, MTCO			Ē
Delta aminolevulinate dehydratase	ALAD	٠	Ē
Delta-7-dehydrocholesterol reductase	DHCR7		Ē
Dihydrolipoamide succinyltransferase	•		· N
Dopamine beta hydroxylase	DBH		E
Dopamine receptors D1	DRD1		N
Dopamine receptors D2	DRD2		N
Dopamine receptors D3	DRD3		N
Dopamine receptors D4	DRD4		N
Dopamine receptors D5	DRD5		N
Endothelin 1	EDN1		N
Endothelin 2	EDN2		N
Endothelin 3	EDN3		N
Endothelin converting enzyme	ECE1	ير دو به	N
Endothelin receptor type A	EDNRA		N
Endothelin receptor type B	EDNRB		N
Enolase	ENO1		E
Epidermal growth factor	EGF		Ğ
Epidermal growth factor receptor	EGFR		Ğ
Excision repair complementation group 4	ERCC4		Ē
protein			-
Fibroblast growth factor	FGF1		G
Fibroblast growth factor receptor 1	FGFR1		Ğ
Fibroblast growth factor receptor 2	FGFR2		G

Fibroblast growth factor receptor 3 Flightless-II, Drosophila homolog of Fragile site, folic acid type, rare, fra(X) A Fragile site, folic acid type, rare, fra(X) E Fragile site, folic acid type, rare, fra(X) F GABA receptor, alpha 1 GABA receptor, alpha 2 GABA receptor, alpha 3 GABA receptor, alpha 4 GABA receptor, alpha 5 GABA receptor, alpha 6 GABA receptor, beta 1 GABA receptor, beta 2 GABA receptor, beta 3 GABA receptor, gamma 1 GABA receptor, gamma 2 GABA receptor, gamma 3 GABA transaminase GDP dissociation inhibitor 1 Geniospasm 1 Glial-cell derived neurotrophic factor (GDNF) receptor	FGFR3 FLII FRAXA FRAXE FRAXF GABRA1 GABRA2 GABRA3 GABRA4 GABRA5 GABRA6 GABRB1 GABRB1 GABRB2 GABRB3 GABRB3 GABRG1 GABRG1 GABRG3 ABAT GDI1 GSM1	00222222222222m002
Glial-cell derived neurotrophic factor, GDNF Glutamate decarboxylase, GAD	GDNF GAD1	N
Glutamate receptor 1		E
Glutamate receptor 2	GLUR1	N
Glutamate receptor 3	GLUR2	N
Glutamate receptor 4	GLUR3	N
Glutamate receptor 5	GLUR4	N
Glutamate receptor 6	GLUR5	N
Glutamate receptor 7	GLUR6 GLUR7	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	. N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
Glutaryl-CoA dehydrogenase	GCDH	N E
Glutathione	GSH · · · · · · · · · · · · ·	T
Glutathione S-transferase, GSTZ1	GSTZ1	Ë
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	E
GAPDH	3/11 B1 1	_
Glycerol kinase	GK	Ε
Glycinamide ribonucleotide (GAR)	GART	E
transformylase		-
Gonadotropin releasing hormone receptor	GNRHR	G
Guanidinoacetate N-methyltransferase	GAMT	E
Guanine nucleotide-binding protein, alpha	GNAO1	N
activating activity polypeptide, GNAO		. •

GNAI1	N
•	
GNAI2	N
GNAI3	N
GNAS1	N
GNAS2	N
GNAS3	N
GNAS4	N
GNAT1	N
GNAT2	N
GNB3	N
	N
	Е
GUCA1A	E
	, I
LIPC	,E N
	N
HMGCP	N E
	- T
	Ë
	!
HIF1A	E
	Ē
IMPA1	N
INS	G
INSR	Ğ
IL1R	ĺ
IL1A	İ
IL1B	1
	GNAI3 GNAS1 GNAS2 GNAS3 GNAS4 GNAT1 GNAT2 GNB3 GNAQ GUCY2D GUCA1A LIPC HMGCR HD HPRT HIF1A IMPA1 INS INSR IL1R IL1A

Interleukin(IL) 10	IL10	ı
Interleukin(IL) 10 receptor	IL10R	i
Interleukin(IL) 11	IL11	i
Interleukin(IL) 11 receptor	IL11R	i
Interleukin(IL) 12	IL12	
Interleukin(IL) 12 receptor, beta 1	IL12RB1	i
Interleukin(IL) 13	IL13	i
Interleukin(IL) 13 receptor	IL13R	i
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	,
Interleukin(IL) 2 receptor, gamma	IL2RG	i
Interleukin(IL) 3	IL3	,
Interleukin(IL) 3 receptor	IL3R	
Interleukin(IL) 4	IL4	i
Interleukin(IL) 4 receptor	IL4R	i
Interleukin(IL) 5	IL5	i
Interleukin(IL) 5 receptor	IL5R	į
Interleukin(IL) 6	IL6	i
Interleukin(IL) 6 receptor	IL6R	i
Interleukin(IL) 7	IL7	i
Interleukin(IL) 7 receptor	IL7R	i
Interleukin(IL) 8	IL8	i
Interleukin(IL) 8 receptor	IL8R	i
Interleukin(IL) 9	IL9	i
Interleukin(IL) 9 receptor	IL9R	i
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	i
IP3 kinase		Ē
Leukin		ī
Mismatch repair gene, PMSL2	PMS2	Ġ
Monoamine oxidase A	MAOA	Ē
Monoamine oxidase B	MAOB	Ē
Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Myelin basic protein		S
Myosin, light chain 3	MYL3	· S
NADPH-dependent cytochrome P450	POR	Ē
reductase		_
Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	Ğ
Neurite inhibitory protein		N
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurofilament protein, NF125	NF150	S
Neurofilament protein, NF200	NF200	S
Neurofilament protein, NF68	NF68	S
		~

NKNA NKNB NPY NPY1R NPY2R NTS NTSR1 NOS1 NOS2 NOS3 NDPKA PDGFB OPRD1 OPRK1 OPRM1 OAT PON1 PARK2 PLA2G10 PLA2G1B PLA2G2A PLA2G4A PLA2G4C PLA2G5 PLA2G6 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1		222222
PSEN1 PSEN2 PRNP PRODH POMC PSAP PPGB PRKCA PRKCG		T T Z E Z E E E E E
	NKNB NPY NPY1R NPY2R NTS NTSR1 NOS1 NOS2 NOS3 NDPKA PDGFB OPRM1 OPRM1 OPRM1 OPRM1 OPRM1 PARK2 PLA2G10 PLA2G1B PLA2G2B PLA2G4C PLA2G5 PLA2G5 PLA2G5 PLA2G6 PLCD1 PLCG1 PDGF PDGFR KCNJ1 POU1F1 PSEN1 PSEN2 PRNP PRODH POMC PSAP PRKCA PRKCG	NKNB NPY NPY1R NPY2R NTS NTSR1 NOS1 NOS2 NOS3 NDPKA PDGFB OPRD1 OPRK1 OPRM1 OAT PON1 PARK2 PLA2G10 PLA2G1B PLA2G2A PLA2G2B PLA2G4A PLA2G5 PLA2G6 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCD1 PLCG1 PDGF PDGFR KCNJ1 POU1F1 PSEN1 PSEN2 PRNP PRODH POMC PSAP PPGB PRKCA PRKCG

Proteolipid protein	PLP	N.
RIGUI	RIGUI	N
S100 calcium-binding protein A1	S100A1	G
S100 calcium-binding protein A2	S100A2	N
S100 calcium-binding protein A3	S100A3	N
S100 calcium-binding protein A4	S100A3	N
S100 calcium-binding protein A5	S100A4 S100A5	N
S100 calcium-binding protein A6	S100A5 S100A6	N
S100 calcium-binding protein A7		N
S100 calcium-binding protein A8	S100A7	N
S100 calcium-binding protein A9	S100A8	Ν
	S100A9	N
S100 calcium-binding protein B	S100B	Ν
S100 calcium-binding protein P	S100P	Ν
Secretase, alpha	•	Ν
Secretase, beta		Ν
Secretase, gamma		Ν
Serotonin N-acetyltransferase	SNAT	Ε
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma	SCNN1G	N
Sodium channel, voltage-gated, type 1, beta	SCN1B	
polypeptide	0011111	Ν
Solute carrier family 12, member 1	SLC12A1	_
Solute carrier family 12, member 2	SLC12A2	T
Solute carrier family 12, member 3	SLC12A2	T
Solute carrier family 4 (anion exchanger),		T
member 1	SLC4A1	T
Solute carrier family 4 (anion exchanger),	SLOAAD	_
member 2	SLC4A2	Т
	01.044.0	
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	Т
	0.0544	
Solute carrier family 5 (sodium/glucose	SLC5A1	T
transporter), member 1	0. 00.0	
Solute carrier family 5 (sodium/glucose	SLC5A2	T

transporter), member 2		
Solute carrier family 5 (sodium/glucose	SLC5A5	т
transporter), member 5	0_000	ı
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ACID transporter), member		•
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		·
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		
Superoxide dismutase 1	SOD1	E
Superoxide dismutase 3	SOD3	E
Synapsin 1a & 1b	SYN1	N
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle amine transporter	SVAT	N
Synaptogyrin		N N
Synaptophysin	SYP	N
Synaptosomal-associated protein, 25KD	SNAP25	. N
Syntaxin 1	STX1	N
Tachykinin receptor, NK1R	TACR1	N
Tachykinin receptor, NK2R	TACR2	. N
Tachykinin receptor, NK3R	TACR3	N
Talin	TLN	G
TEK, tyrosine kinase, endothelial	TEK	. E
Telomerase protein component		· E
Transcobalamin 1, TCN1	•	T
Transcobalamin 2, TCN2	TCN2	· T
Transcription factor, TUPLE1	TUPLE1	N
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Transthyretin	TTR	T.
Trypsin inhibitor		E
Tryptophan 2,3-dioxygenase	TDO2	N
Tryptophan hydroxylase	TPH	E
Tumour necrosis factor (TNF) receptor	TRAF1	′^r
associated factor 1		
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2		
Tumour necrosis factor (TNF) receptor	TRAF3	l
associated factor 3		
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4	70455	
Tumour necrosis factor (TNF) receptor	TRAF5	I
associated factor 5	T0.456	
Tumour necrosis factor (TNF) receptor	TRAF6	1

associated factor 6		
Tumour necrosis factor alpha	TNFA	1
Tumour necrosis factor alpha receptor	TNFAR	i
Tumour necrosis factor beta	TNFB	i
Tumour necrosis factor beta receptor	TNFBR	I
Tyrosinase	TYR	Ė
Tyrosine hydroxylase	TH	. E
Ubiquitin		Ğ
Ubiquitin activating enzyme, E1		Ē
Ubiquitin B	UBB	Ğ
Ubiquitin C	UBC	G
Ubiquitin protein ligase E3A	UBE3A	Ē
UDP-glucuronosyltransferase 1	ugt1d, UGT1	Ē
UDP-glucuronosyltransferase 2	UGT2	Ē
Uridinediphosphate(UDP)-galactose-4-	GALE	E
epimerase	•	_
Vacuolar proton pump, subunit 1	VPP1	N
Vacuolar proton pump, subunit 3	VPP3	N
Vesicular monoamine transporter 1	VMAT1	N
Vesicular monoamine transporter 2	VMAT2	N

- 211.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 210.
- 212.A set according to claim 210 or 211 in which a minority of said probes for listed genes are absent.
- 213.A set according to claim 210 or 211 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 214.A set according to claim 210 or 211 in which a limited number of probes are replaced by probes for non-listed genes.
- 215.A set of probes for a core group of genes according to any of claims 210 to 214 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 216.A set according to any of claims 210 to 215 consisting of probes for members of a sub-group of the core group.
- 217.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.

- 218.A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 219.A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 220.A set according to claim 217 or 218 in which said substrate is a semiconductor microchip.
- 221.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 222. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 223. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 224.A medical device including a set according to any of claims 210 to 222 for use in an array for detection of differential gene expression levels.
- 225. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 210) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 210 and 212 to 222 and relating the probe hybridisation pattern to said variations.
- 226. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 211) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 211 to 222 and relating the probe interaction pattern to said variations.
- 227. Use of a set or device according to any of claims 210 to 222 for the prognosis and management of patients suffering from or at risk of experiencing the symptoms and consequences of psychotic disorders and disorders of personality.
- 228.Use of a set or device according to any of claims 210 to 222 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 229. Use of a set or device according to any of claims 210 to 222 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 230. Use of a set or device according to any of claims 210 to 222 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 231. Use of a set or device according to any of claims 210 to 222 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 232. Use of a set or device according to any of claims 210 to 222 for the development of new strategies of therapeutic intervention and in clinical trials.
- 233. Use of a set or device according to any of claims 210 to 222 for construction of and generation of algorithms for patient and healthcare management.
- 234. Use of a set or device according to any of claims 210 to 222 for modelling or assessing the impact of diseases or healthcare management strategies on

- individuals, groups, patient cohorts or populations
- 235. Use of a set or device according to any of claims 210 to 222 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 236.Use of a set or device according to any of claims 210 to 222 for predicting optimum configuration/management of thereapeutic intervention.
- 237.A method according to claim 225 or 226 in which the identification of gene variants is indicative of a higher risk of developing the symptoms and consequences of psychotic disorders and disorders of personality for the patient or individual.
- 238. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop the symptoms and consequences of psychotic disorders and disorders of personality, which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from the symptoms and consequences of psychotic disorders and disorders of personality;
- obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the symptoms and consequences of psychotic disorders and disorders of personality;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 210 to 216;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing the symptoms and consequences of psychotic disorders and disorders of personality.
- 239. A method for assessing whether a given subject will be at risk of developing the symptoms and consequences of psychotic disorders and disorders of personality, which comprises comparing said subject's genotype with a model generated by the method of claim 238.
- 240. A method according to any of claims 225, 226, 238 and 239 wherein at least one step is computer-controlled.
- 241. An assay suitable for use in a method according to any of claims 225, 226, 238 and 239; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 210 to 216 in a biological sample.
- 242. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms and consequences of psychotic disorders and disorders of personality; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 210 or 210 to 216 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - readout indicating the probability of a patient or individual developing the symptoms and consequences of psychotic disorders and disorders of personality.

- 243. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms and consequences of psychotic disorders and disorders of personality; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 211 to 216 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process
 - readout indicating the probability of a patient or individual developing the symptoms and consequences of psychotic disorders and disorders of personality.
- 244. A set of probes according to claim 210, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 245.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to cardiovascular disease, dysfunction and/or damage; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

CARDIOVASCULAR GENE LIST	HUGO gene symbol	Protein function
17beta hydroxysteroid oxidoreductase		E
2,3-bisphosphoglycerate mutase	BPGM	Ē
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	Ē
3-oxoacid CoA transferase	OXCT	**** E
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	Ē
Acetoacetyl 1-CoA-thiolase	ACAT1	Е
Acetoacetyl 2-CoA-thiolase	ACAT2	Ē
Acetyl CoA acyltransferase	ACAA	Ē
Acetylcholinesterase	ACHE	Ē
Acid phosphatase 2, lysosomal	ACP2	Ē
Acidic amino acid transporter		· -
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	Š

Alanine aminotransferase Alanine-glyoxylate aminotransferase Albumin, ALB Alcohol dehydrogenase 1 Alcohol dehydrogenase 2 Alcohol dehydrogenase 3 Alcohol dehydrogenase 5 Alcohol dehydrogenase 6 Alcohol dehydrogenase 7 Alcohol dehydrogenase 7 Aldehyde dehydrogenase 1 Aldehyde dehydrogenase 10 Aldehyde dehydrogenase 2 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 7 Aldehyde dehydrogenase 7 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 7 Aldehyde dehydrogenase 7	Actin, alpha, smooth, aortic Activin A receptor, type 2B Acyl CoA dehydrogenase, long chain Acyl CoA dehydrogenase, very long chain Adaptin, beta 3A Adducin, alpha Adducin, beta Adenosine deaminase Adenosine receptor A1 Adenosine receptor A2A Adenosine receptor A3 Adenosine receptor A3 Adenylate cyclase 1 Adenylate cyclase 2 Adenylate cyclase 3 Adenylate cyclase 5 Adenylate cyclase 5 Adenylate cyclase 6 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 9 Adenylate cyclase 8 Adenylate cyclase 9 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 8 Adenylate cyclase 3 Adenylate cyclase 3 Adenylate cyclase 3 Adenylate cyclase 4 Adenylate cyclase 3	ACTA2 ACVR2B ACADL ACADVL ADTB3A ADD1 ADD2 ADA ADORA1 ADORA2A ADORA2B ADORA3 ADCY1 ADCY2 ADCY3 ADCY4 ADCY5 ADCY6 ADCY7 ADCY8 ADCY7 ADCY8 ADCY7 ADCY8 ADCY9 AK1 ADRA1 ADRA1 ADRA2 ADRB1 ADRB2 ADRB3 ACTHR	8 G H H T 8 S H Z Z Z Z H H H H H H H H H H H Z Z Z Z Z G
Aldolase B ALDOB E Aldolase C ALDOC E	Alanine aminotransferase Alanine-glyoxylate aminotransferase Albumin, ALB Alcohol dehydrogenase 1 Alcohol dehydrogenase 2 Alcohol dehydrogenase 3 Alcohol dehydrogenase 5 Alcohol dehydrogenase 6 Alcohol dehydrogenase 7 Aldehyde dehydrogenase 1 Aldehyde dehydrogenase 10 Aldehyde dehydrogenase 2 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 7 Aldolase A Aldolase B Aldolase C	ALB ADH1 ADH2 ADH3 ADH5 ADH6 ADH7 ALDH1 ALDH10 ALDH2 ALDH5 ALDH6 ALDH6 ALDH7 ALDOA ALDOB ALDOC	T

Alpha 1 acid glycoprotein	AAG; AGP	Т
Alpha 2 macroglobulin	A2M	İ
alpha1-antitrypsin	PI	Ė
alpha2-antiplasmin	PLI	E
alpha-actinin 2	ACTN2	G
alpha-actinin 3	ACTN3	G
alpha-Galactosidase A	GLA	
alpha-L-Iduronidase	IDUA	E E
Aminopeptidase P	XPNPEP2	
Amphiregulin	AREG	E
Amylo-1,6-glucosidase	AGL	G
· · · · · · · · · · · · · · · · · · ·		E
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	E
Angiotensin receptor 1	AGTR1	T
Angiotensin receptor 2	AGTR2	Т
Angiotensinogen	AGT	Ε
Ankyrin 1	ANK1	· S
Ankyrin 2	ANK2	S
Ankyrin 3	ANK3	S
Annexin 1	ANX 1	1
Antidiuretic hormone receptor	ADHR	T
Antithrombin III	AT3	E
Apolipoprotein (a)	LPA	T
Apolipoprotein A 4	APOA4	Т
Apolipoprotein A I	APOA1	Т
Apolipoprotein A II	APOA2	Ŧ
Apolipoprotein B	APOB	Т
Apolipoprotein C1	APOC1	Т
Apolipoprotein C2	APOC2	Т
Apolipoprotein C3	APOC3	Т
Apolipoprotein D	APOD	Ť
Apolipoprotein E	APOE	Ť
Apolipoprotein H	APOH ·	Ť
Aquaporin 1	AQP1	Ť
Aquaporin 2	AQP2	Ť
Arginine vasopressin	AVP	.N
Arginine vasopressin receptor 1A	AVPR1A	N
Arginine vasopressin receptor 1B	AVPR1B	N
Arginine vasopressin receptor 2	AVPR2	N
Arginosuccinate lyase	ASL	E
Arylsulfatase B	ARSB	
Aspartylglucosaminidase	AGA	E
Ataxia telangiectasia gene, AT	ATM	E
ATP/ADP translocase	⊼ LIVI	G
	A D C 7	E
ATP-binding cassette transporter 7	ABC7	
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G

Atrial natri	uretic peptide receptor B	NDDO	_
		NPR2	G
	uretic peptide receptor C	NPR3	G
	ne regulator, AIRE	AIRE	1
	ed protein A1	BCL2A1	G
beta 2 mici	•	B2M	ı
	phin receptor		N
Bile acid co	penzyme A: amino acid N-	BAAT	Е
acyltransfe	rase		
Bile salt ex	port pump	BSEP, PFIC2	Т
Bile salt-sti	mulated lipase	CEL	Ė
	OP-glucuronosyltransferase		Ē
	drome protein	BLM	· G
•	receptor B1)
	receptor B2	•	1
Butyrylchol		BCHE	Ė
	sporting ATPase, fast twitch	ATP2A1	T
	sporting ATPase, slow twitch	ATP2A2	T
Cadherin E		CDH1	
Cadherin E		CDITI	G
Cadherin N	•	CDH2	G
Cadherin P			G
Calbindin 1		CDH3	G
Calbindin D		CALB1	G
		CALB3	G
Calcineurin		CALNA1	l ·
Calcineurin		CALNA2	. 1
Calcineurin		CALNA3	ļ
Calcineurin	•		1
	annel, voltage-dependent, alpha	CACNA1F	N
1F subunit			
	annel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL			
Calcium ch	annel, voltage-dependent, Alpha-	CACNA1C	N
1C			
	annel, voltage-dependent, Alpha-	CACNA1D	N
1D			
Calcium ch	annel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL			•
	annel, voltage-dependent, Alpha-	CACNA2	N
2/delta			
	annel, voltage-dependent, Beta 1		N
Calcium cha	annel, voltage-dependent, Beta 3	CACNB3	N
	annel, voltage-dependent, L type,		N
alpha 1S su			
Calcium cha	annel, voltage-dependent,	CACNG2	N
Neuronal, G			. •
	annel, voltage-dependent, P/Q	CACNA1A	N
type, alpha			. •
	annel, voltage-dependent, T-type		N
	, J -,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		1.4

Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CAMK2A	G
Calpain	CAPN, CAPN3	Ε
Calretinin	CALB2	N
Carbonic anhydrase 3	CA3	E
Carbonic anhydrase 4	CA4	Ē
Carbonic anhydrase, alpha	CA1	Ē
Carbonic anhydrase, beta	CA2	Ē
Carboxypeptidase	CPN	Ē
Cardiac-specific homeobox, CSX	CSX	G
Carnitine acylcarnitine translocase	CACT	E
Carnitine transporter protein	CDSP, SCD	T
Cartilage-hair hypoplasia gene	CHH	N
Catechol-O-methyltransferase	COMT	E
Caveolin 3	CAV3	E
CD1	CD1	
CD4	CD4	
Cdc 25 phosphatase	OD4	G
Cell adhesion molecule, intercellular, ICAM	ICAM1	G
Cell adhesion molecule, leukocyte-	LECAM1	G
endothelial, LECAM (CD62)	·	G
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	PECAM1	G
PECAM	LOAMI	G .
Cell adhesion molecule, vascular, VCAM	VCAM1	G
Cellubrevin	CEB	N
Ceroid lipofuscinosis neuronal 3	CLN3	N
Ceruloplasmin precursor	CP	E
Chemokine receptor CCR2	CCR2	
Chemokine receptor CCR3	CCR3	1
Chemokine receptor CCR5	CCR5	! !
Chemokine receptor CXCR1	CXCR1	
Chemokine receptor CXCR2	CXCR2	l Sees elemen
Chemokine receptor CXCR4	CXCR4	1
Chloride channel KB	CLCNKB	
		S
Cholestasis, progressive familial intrahepatic	ric i	G
1 gene	CETD	-
Cholesterol ester transfer protein	CETP	T
Choline acetyltransferase	CHAT	E
Clothein	CHY1	<u>.</u> .
Clathrin	CIZNIA	T
Cockayne syndrome gene, CKN1	CKN1	G
Collagen I alpha 1	COL1A1	S

Collagen II alpha 1 Collagen III alpha 1 Collagen IV alpha 1 Collagen IV alpha 1 Collagen IV alpha 2 Collagen IV alpha 3 Collagen IV alpha 4 Collagen IV alpha 5 Collagen IV alpha 6 Collagen IX alpha 2 Collagen IX alpha 3 Collagen V alpha 1 Collagen V alpha 1 Collagen V alpha 1 Collagen VI alpha 2 Collagen VI alpha 3 Collagen VI alpha 3 Collagen VI alpha 3	COL1A2 COL2A1 COL3A1 COL4A1 COL4A2 COL4A3 COL4A4 COL4A5 COL4A6 COL9A2, EDM2 COL9A3 COLR COL5A1 COL5A1 COL5A2 COL6A1 COL6A2 COL6A3		\$ 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Collagen VII alpha 1 Collagen X alpha 1	COL7A1 COL10A1		S S
Collagen X alpha 1	COL11A1		S
Collagen XI alpha 2	COL11A2		S
Collagen XVII alpha 1	COL17A1		S
Collagenic-like tail subunit of asymmetric	COLQ		Ē
acetylcholinesterase	•		
Colony-stimulating factor 2 beta receptor	CSF2RB		G
Colony-stimulating factor 3	CSF3		G
Colony-stimulating factor 3 receptor	CSF3R		G
Corticosteroid binding globulin	CBG		Ν
Cortico-steroid binding protein			Т
Corticotrophin-releasing hormone	CRH		T
Corticotrophin-releasing hormone receptor	CRHR1		Т
Creb binding protein	CREBBP		G
Cu2+ transporting ATPase alpha polypeptide			Ε
Cu2+ transporting ATPase beta polypeptide	ATP7B		E
Cubilin	CUBN		T
Cyclic AMP-dependent protein kinase	PKA		Ε
Cyclin-dependent kinase 2	CDK2		G
Cyclin-dependent kinase inhibitor 1C (P57,	CDKN1C	•	G
KIP2)			
Cyclooxygenase 1	COX1		E
Cyclooxygenase 2 CYP11A1	COX2		Ε
	CYP11A1		E
CYP11B1	CYP11B1		E
CYP11B2 CYP17	CYP11B2		E
CYP19	CYP17		E
CYP1A1	CYP19		E
CYP1A1 CYP1A2	CYP1A1		E
U11 1/1/2	CYP1A2		Ε

CYP1B1 CYP21 CYP24 CYP27 CYP27B1	CYP1B1 CYP21 CYP24 CYP27 PDDR	E E E E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	E
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A7 CYP2B6	E
CYP2B6 CYP2C18	CYP2B6 CYP2C18	E
CYP2C18 CYP2C19	CYP2C18 CYP2C19	E E
CYP2C19 CYP2C8	CYP2C19 CYP2C8	E
CYP2C9	CYP2C9	E
CYP2D6	CYP2D6	E
CYP2E1	CYP2E1	Ē
CYP2F1	CYP2F1	Ē
CYP2J2	CYP2J2	E
CYP3A3	CYP3A3	. Е
CYP3A4	CYP3A4	E
CYP3A5	CYP3A5	E
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	E
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	E
CYP4F3	CYP4F3 CYP51	E E
CYP51 CYP5A1	CYP5A1	E
CYP7A	CYP7A	E
CYP8	CYP8	E
Cystathionase	CTH	E
Cystathione beta synthase	CBS	Ē
Cytidine deaminase	CDA	Ē
Cytidine-5-prime-triphosphate synthetase	CTPS	Ē
Cytochrome a		Ε
Cytochrome b-5	CYB5	E
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
DAX1 nuclear receptor	DAX1	<u> 1</u>
Delta aminolevulinate dehydratase	ALAD	E
Delta(4)-3-oxosteroid 5-beta-reductase	D. 10.D.7	E
Delta-7-dehydrocholesterol reductase	DHCR7	E
Deoxycorticosterone (DOC) receptor Desmin	DES	E
Dihydrodiol dehydrogenase 1	DDH1	S E
Dihydrofolate reductase	DHFR	E
Dihydrolipoyl dehydrogenase	DI II IX	E
Ding all onpognition of the control	•	<u> </u>

Factor VII	F7	i
Factor VIII	F8	i
Factor X	F10	i
Factor XI	F11	j
Factor XII	F12	i
Factor XIII A & B	F13A & F13B	Ī
Fanconi anemia, complementation group A	FANCA	Ť
Fanconi anemia, complementation group C	FANCC	Ť
Fanconi anemia, complementation group D	FANCD	Ť
Fatty acid binding proteins FABP1		Ť
Fatty acid binding proteins FABP2	FABP2	Ť
Fatty acid binding proteins FABP3	·	Ť
Fatty acid binding proteins FABP4		Ť
Fatty acid binding proteins FABP5		Ť
Fatty acid binding proteins FABP6		Ť
Fc fragment of IgG, high affinity IA, receptor	FCGR1A	Ġ
for		_
Fc fragment of IgG, low affinity IIa, receptor-	FCGR2A	· G
for (CD32)		
Fc fragment of IgG, low affinity Illa, receptor	FCGR3A	G
for (CD16)		
Fibrillin 1	FBN1	G
Fibrillin 2	FBN2	G
Fibrinogen alpha	FGA	S
Fibrinogen beta	FGB	S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
Flightless-II, Drosophila homolog of	FLII	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Formiminotransferase	EDAWA	E
Fragile site, folic acid type, rare, fra(X) A	FRAXA	N
Fucosidase alpha-L-2	CLICA CONTACT	E
Fucosyltransferase 2 Fucosyltransferase 3	FUT2	T
Fucosyltransferase 6	FUT3	T
•	FUT6	T
Fukuyama type congenital muscular dystrophy	FCMD	G
GABA receptor, alpha 1	CARDA4	
GABA receptor, alpha 1	GABRA1	N
	GABRA2	N
GABA receptor, alpha 3 GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5	GABRA4 GABRA5	N
GABA receptor, alpha 5 GABA receptor, alpha 6	GABRA6	N
CADA receptor, alpha o	GADRAU	N

GABA receptor, beta 1	GABRB1		N
GABA receptor, beta 2	GABRB2		N
GABA receptor, beta 3	GABRB3		Ν
GABA receptor, gamma 1	GABRG1		Ν
GABA receptor, gamma 2	GABRG2		Ν
GABA receptor, gamma 3	GABRG3		Ν
GABA transaminase	ABAT		E
Galactose 1-phosphate uridyl-transferase	GALT		E
Galactosyltransferase 1	GT1		G
Galactosyltransferase, alpha 1,3	GGTA1		G
Galactosyltransferase, beta 3	B3GALT		G
Galanin	GAL		N
Galanin receptor	GALNR1		N
Gamma-glutamyl carboxylase	GGCX		Т
Gap junction protein alpha 1	GJA1		T
Gap junction protein beta 1	GJB1		T
Gap junction protein beta 2	GJB2		T
Glucocorticoid receptor	GRL		G
Glucosaminyl (N-acetyl) transferase 2, I-	GCNT2		Ε
branching enzyme			
Glucosidase, acid alpha	GAA		Ε
Glucosidase, acid beta	GBA		E
Glutamate decarboxylase, GAD	GAD1		Ε
Glutamate receptor 1	GLUR1		Ν
Glutamate receptor 2	GLUR2		Ν
Glutamate receptor 3	GLUR3		Ν
Glutamate receptor 4	GLUR4		N
Glutamate receptor 5	GLUR5		Ν
Glutamate receptor 6	GLUR6		Ν
Glutamate receptor 7	GLUR7		Ν
Glutamate receptor, ionotropic, NMDA 1	NMDAR1		N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A		- N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B		Ν
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	•	Ν
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D		Ν
Glutamate-cysteine ligase	GLCLC		Ε
Glutaryl-CoA dehydrogenase	GCDH		È
Glutathione	GSH		Т
Glutathione peroxidase, GPX1	GPX1		Ε
Glutathione reductase, GSR	GSR		Ε
Glutathione S-transferase, GSTZ1	GSTZ1		Ε
Glyceraldehyde-3-phosphate	GAPDH		E
dehydrogenase, GAPDH			
Glycerol kinase	GK		Ε
Glycinamide ribonucleotide (GAR)	GART		E
transformylase			
Glycophorin A	GYPA		S
Glycophorin B	GYPB		Š

Glycophorin C	GYPC	S
Glycosyltransferases, ABO blood group	ABO	E
Growth arrest-specific homeobox	GAX	. G
Guanine nucleotide-binding protein, alpha	GNAO1	
activating activity polypeptide, GNAO		N
Guanine nucleotide-binding protein, alpha	GNAI1	
inhibiting activity polypeptide 1, GNAI1	GNAIT	N
Guanine nucleotide-binding protein, alpha	CNIAIO	
	GNAI2	N
inhibiting activity polypeptide 2, GNAI2	011110	•
Guanine nucleotide-binding protein, alpha	GNAI3	Ν
inhibiting activity polypeptide 3, GNAI3		
Guanine nucleotide-binding protein, alpha	GNAS1	N
stimulating activity polypeptide, GNAS1		
Guanine nucleotide-binding protein, alpha	GNAS2	N
stimulating activity polypeptide, GNAS2		
Guanine nucleotide-binding protein, alpha	GNAS3	· N
stimulating activity polypeptide, GNAS3		
Guanine nucleotide-binding protein, alpha	GNAS4	N
stimulating activity polypeptide, GNAS4		
Guanine nucleotide-binding protein, beta	GNB3	N
polypeptide 3	•	
Guanine nucleotide-binding protein, gamma	GNG5	N
polypeptide 5		
Guanine nucleotide-binding protein, q	GNAQ	N
polypeptide		, ,
Guanylyl cyclase		E
H(+), K(+) - ATPase	ATP4B	N
Haemoglobin alpha 1	HBA1	Ť
Haemoglobin alpha 2	HBA2	Ť
Haemoglobin beta	HBB	Ť
Haemoglobin delta	HBD	Ť
Haemoglobin epsilon		Ť
Haemoglobin gamma A	HBG1	Ť
Haemoglobin gamma B	HBG2	Ť
Haemoglobin gamma G	HBGG	· -
Haptoglobin, alpha 1	HPA1	
Haptoglobin, alpha 2	HPA2	l Į
 Haptoglobin, beta	HPB	1 ****
Heat shock protein, HSP60	111 6	1
Heat shock protein, HSP70		i
Heat shock protein, HSP90		1
Heat shock protein, HSPA1		1
Heat shock protein, HSPA2		!
Hemochromatosis	LICE	<u> </u>
	HFE	Ţ
Hemopexin	HPX	<u> </u>
Heparan sulfamidase	UDECE	E
Heparin Cofactor II	HBEGF	G
Heparin Cofactor II	HCF2	-1

Hepatic lipase	LIPC	E
Hermansky-pudlak syndrome gene	HPS	Т
Hexokinase 1	HK1	E
Hexosaminidase A	HEXA,TSD	Ε
Hexosaminidase B	HEXB	Ε
Histidine-rich glycoprotein	HRG	Т
HLA-B associated transcript 1	BAT1	1
HLH transcription factor HAND1	HAND1	G
HLH transcription factor HAND2	HAND2	G
HMG-CoA lyase	HMGCL	E
HMG-CoA reductase	HMGCR	Ε
HMG-CoA synthase	HMGCS2	E E
Homeobox (HOX) gene A13	HOXA13	G
Homeobox HB24	HLX1	G
Hormone-sensitive lipase	HSL	E
Human chorionic gonadtrophin, hCG	CG	G
Human placental lactogen	CSH1	G
Hypoxanthine-guanine	HPRT	·E
phosphoribosyltransferase, HGPRT		
Hypoxia inducible factor 1	HIF1A	. Е
Hypoxia inducible factor 2		Ε
IC7 A and B		1
Iduronate 2 sulphatase	IDS	E
Indian hedgehog, ihh	IHH	G
Inosine triphosphatase	ITPA	Ε
Inositol 1,4,5-triphosphate receptor 1	ITPR1	G
Inositol 1,4,5-triphosphate receptor 3	ITPR3	G
Inositol monophosphatase	IMPA1	N
Inositol polyphosphate 1-phosphatase	INPP1	N
Insulin	INS	G
Insulin receptor	INSR	G
Insulin receptor substrate-1	IRS1	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2 Insulin-like growth factor 2 receptor	IGF2	G
Integrin beta 1	IGF2R	G
Integrin beta 2	ITGB1	G
Integrin beta 3	ITGB2	G.
Integrin beta 4	ITGB3	G
Integrin beta 5	ITGB4	G
Integrin beta 6	ITGB5	G
Integrin beta 7	ITGB6	G
Integrin, alpha 1	ITGB7	G
Integrin, alpha 2	ITGA1	G
Integrin, alpha 2	ITGA2	G
Integrin, alpha 3	ITGA3	G
Integrin, alpha 5	ITGA4	G
ייייטאַיייי, מוףוומ ט	ITGA5	G

Integrin, alpha 6	ITGA6	G
Integrin, alpha 7	ITGA7	Ğ
Integrin, alpha 8	ITGA8	Ğ
Integrin, alpha 9	ITGA9	· G
Integrin, alpha M	ITGAM	G
Integrin, alpha X	ITGAX	G
Inter-alpha-trypsin inhibitor, IATI		E
Intercellular adhesion molecule 1	ICAM1	L.
Intercellular adhesion molecule 2	ICAM2	:
Intercellular adhesion molecule 3	ICAM3	1
Interferon alpha	IFNA1	1
Interferon beta	IFNB	1
Interferon gamma	IFNG	;
Interferon gamma receptor 1	IFNGR1	!
Interferon gamma receptor 2	IFNGR2	1
Interleukin(IL) 1 receptor	IL1R	!
Interleukin(IL) 1, alpha	IL1A	!
Interleukin(IL) 1, apria	IL1B	i
Interleukin(IL) 10	IL10	
Interleukin(IL) 10 receptor	IL10R	!
Interleukin(IL) 11	IL11	, !
Interleukin(IL) 11 receptor	IL11R	!
		!
Interleukin(IL) 12	IL12	
Interleukin(IL) 12 receptor, beta 1	IL12RB1	!
Interleukin(IL) 13	IL13	
Interleukin(IL) 13 receptor	IL13R	l l
Interleukin(IL) 2	IL2	l .
Interleukin(IL) 2 receptor, alpha	IL2RA	
Interleukin(IL) 2 receptor, gamma	IL2RG	I
Interleukin(IL) 3	IL3	!
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	, !
Interleukin(IL) 4 receptor	IL4R	
Interleukin(IL) 5	1L5	1
Interleukin(IL) 5 receptor	· IL5R	İ
Interleukin(IL) 6	IL6	1
Interleukin(IL) 6 receptor	IL6R	!
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	ļ
Interleukin(IL) 8	IL8	
Interleukin(IL) 8 receptor	IL8R	
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	j
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	I
IP3 kinase		E
Isovaleric acid CoA dehydrogenase	IVD	Е
Kallikrein 3	KAK3	1
Kell blood group precursor	XK, KEL	Т

•			
Ketohexokinase	KHK		E
Kininogen, High molecular weight	KNG		Ī
Kynureninease			Ė
Lactate dehydrogenase, A	LDHA		E
Lactate dehydrogenase, B	LDHB		Ē
Lamin A/C	LMNA		Ğ
Laminin 5, alpha 3	LAMA3		Ğ
Laminin 5, beta 3	LAMB3		G
Laminin 5, gamma 2	LAMC2		G
Laminin M	LAMM		G
Laminin receptor 1	LAMR1		G
Latent transforming growth factor-beta	LTBP2		G
binding protein 2			G
Lecithin-cholesterol acyltransferase	LCAT		Ε
Lectin, mannose-binding 1	LMAN1		-
Lectin, mannose-binding 2	MBL2		
Leptin	LEP		G
Leptin receptor	LEPR		
Leukocyte-specific transcript 1	LST-1		G
Leukotriene A4 synthase	LTA4S		-
Leukotriene B4 receptor	LIA43	÷	E
Leukotriene B4 synthase	LTB4S		١
Leukotriene C4 synthase	LTC4S		E
LIM homeobox protein 1	LHX1		
Lipocortin 1	- ANX4		G
Lipoprotein lipase	LPL		i
Lipoprotein lipase Lipoprotein receptor, Low Density	LDLR		1
Lipoprotein, High Density	HDLDT1		Ţ
Lipoprotein, Very Low Density	VLDLR		Ţ
Lipoprotein, very Low Bensity Lipoprotein-associated coagulation factor	LACI		Ţ
Lipoxygenase	LACI		1
Lipoxygenase Lipoxygenase 12 (platelets)	LOG12		E
Long QT-type 2 potassium channels			
	LQT2, KCNH2		T
Low density lipoprotein receptor-related	LRP		Т
protein precursor	1664		_
Lymphoid enhancer-binding factor	LEF-1		G
Lysosomal acid lipase	LIPA		E
Macrophage inflammatory protein-2	MIP2		1
MAD (mothers against decapentaplegic,	MADH4		G
Drosophila) homologue 4			
MADS box transcription-enhancer factor 2A	MEF2A		G
MADS box transcription-enhancer factor 2B	MEF2B		G
Mannosidase, alpha B lysosomal	MANB		Ε
Matrix Gla protein	MGP		G
Matrix metalloproteinase 1	MMP1		Ε
Matrix metalloproteinase 10	MMP10		Ε
Matrix metalloproteinase 11	MMP11		Ε
Matrix metalloproteinase 12	MMP12		E

Matrix metalloproteinase 13	MMP13	Е
Matrix metalloproteinase 14	MMP14	Ē
Matrix metalloproteinase 15	MMP15	Ē
Matrix metalloproteinase 16	MMP16	Ē
Matrix metalloproteinase 17	MMP17	E
Matrix metalloproteinase 18	MMP18	E
Matrix metalloproteinase 19	MMP19	Ē
Matrix metalloproteinase 2	MMP2	E
Matrix metalloproteinase 3	MMP3, STMY1	E
Matrix metalloproteinase 4	MMP4	Ē
Matrix metalloproteinase 5	MMP5	Ē
Matrix metalloproteinase 6	MMP6	Ē
Matrix metalloproteinase 7	MMP7	Ē
Matrix metalloproteinase 8	MMP8	E
Matrix metalloproteinase 9	MMP9	Ē
Melanocortin 2 receptor	MC2R	T
Melanocortin 4 receptor	MC4R	Ť
Methionine synthase	MTR	E
Methionine synthase reductase	MTRR	F
Methylmalonyl-CoA mutase	MUT	E
Mevalonate kinase	MVK	Ē
MHC Class i: A		ī
MHC Class I: B		i
MHC Class I: C		· i
MHC Class I: LMP-2, LMP-7		į
MHC Class I: Tap1	ABCR, TAP1	i
MHC Class II: DP	HLA-DPB1	i
MHC Class II: DQ		i
MHC Class II: DR		i
MHC Class II: Tap2	TAP2, PSF2	i
MHC Class II:Complementation group A	MHC2TA	i
MHC Class II:Complementation group B	rfxank	i
MHC Class II:Complementation group C	RFX5	i
MHC Class II:Complementation group D	RFXAP	Ì
Microsomal triglyceride transfer protein	MTP	T
Mismatch repair gene, PMSL2	PMS2	Ġ
Mitochondrial trifunctional protein, alpha	HADHA	Ē
subunit		
Mitochondrial trifunctional protein, beta	HADHB	Е
subunit		_
Molybdenum cofactor synthesis 1	MOCS1	Ε
Molybdenum cofactor synthesis 2	MOCS2	Ē
Monoamine oxidase A	MAOA	Ē
Monoamine oxidase B	MAOB	Ē
Monocyte chemoattractant protein 1	MCP1	- 1
Mucolipidoses	GNPTA	É
Mulibrey nanism	MUL	T
Muscarinic receptor, M1	CHRM1	Ņ
,		1 4

Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
MutS homolog 3	MSH3	G
Myoglobin		T
Myosin, cardiac	MYH7	S
Myosin, light chain 2	MYL2	S
Myosin, light chain 3	MYL3	S
Myosin-binding protein C, cardiac	MYBPC3	Š
Myotubularin	MTM1	Š
Na+, K+ ATPase, alpha	ATP1A1	Ğ
Na+, K+ ATPase, beta 1	ATP1B1	Ğ
Na+, K+ ATPase, beta 2	ATP1B2	Ğ
Na+, K+ ATPase, beta 3	ATP1B3	Ğ
Na+/H+ exchanger 1	NHE1	Ť
Na+/H+ exchanger 2	NHE2	T
Na+/H+ exchanger 3	NHE3	Т
Na+/H+ exchanger 4	NHE4	T
Na+/H+ exchanger 5	NHE5	. Т
N-acetylglucosamine-6-sulfatase	GNS	E
NADPH oxidase		1
NADPH-dependent cytochrome P450	POR	E
reductase		
NB6		1.
Nebulin	NEB	S
Nephronophthisis 1	NPHP1	Т
Neuraminidase sialidase	NEU	T
Neuregulin	HGL	G
Neurite inhibitory protein		Ν
Neuroendocrine convertase 1	NEC1, PCSK1	E
Neurokinin A	NKNA	N
Neurokinin B	NKNB	. N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	Ν
Neuropeptide Y receptor Y2	NPY2R	N
Neutrophil cystolic factor 1	NCF1	ŀ
Neutrophil cystolic factor 2	NCF2	
Niemann-Pick disease protein	NPC1	T
Nitric oxide synthase 1, NOS1	NOS1	Ε
Nitric oxide synthase 2, NOS2	NOS2	Ε
Nitric oxide synthase 3, NOS3	NOS3	E
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL	t
Oncogene sis	PDGFB	G
Oncostatin M	OSM	G
Oncostatin M receptor	OSMR	G
Osteonectin	ON	G

Osteopontin Osteoprotegerin Pancreatic lipase Pancreatic lipase related protein 1 Pancreatic lipase related protein 2 Paraoxonase PON1 Paraoxonase PON2 Paraoxonase PON3 Parvalbumin Patched (Drosophila) homolog, PTCH PCNA (proliferating cell nuclear antigen) Pepsinogen	OPN OPG PNLIP PLRP1 PLRP2 PON1 PON2 PVALB PTCH		000000000000000000000000000000000000000
Peroxidase, salivary Peroxisomal membrane protein 1 Peroxisomal membrane protein 3 Peroxisome biogenesis factor 1 Peroxisome biogenesis factor 19 Peroxisome biogenesis factor 6 Peroxisome biogenesis factor 7	SAPX PXMP1 PXMP3 PEX1 PEX19 PEX6 PEX7		E S T T T T
Peroxisome proliferative activated receptor, alpha	PPARA		Ť
Peroxisome proliferative activated receptor,	PPARG		Т
gamma Peroxisome receptor 1 P-glycoprotein 3 Phosphatidylinositol glycan, class A	PXR1 PGY3 PIGA		T T G
(paroxysmal nocturnal hemoglobinuria) Phosphatidylinositol transfer protein Phosphofructokinase, muscle Phosphoglucose isomerase Phospholipase A2, group 10 Phospholipase A2, group 1B Phospholipase A2, group 2A Phospholipase A2, group 2B Phospholipase A2, group 4A Phospholipase A2, group 4C Phospholipase A2, group 5 Phospholipase A2, group 6 Phospholipase C alpha	PITPN PFKM GPI PLA2G10 PLA2G1B PLA2G2A PLA2G2B PLA2G4A PLA2G4C PLA2G4C PLA2G5 PLA2G6	· 4	GEEIIII
Phospholipase C beta Phospholipase C delta Phospholipase C epsilon Phospholipase C gamma Phosphomannomutase-2 Phosphoribosyl pyrophosphate synthetase Phosphorylase kinase, alpha 2 Phytanoyl-CoA hydroxylase Plasminogen	PLCD1 PLCG1 PMM2 PRPS1 PHKA2 PHYH PLG		IIIIEEGE

	•	
Plasminogen activator inhibitor 1	PAI1	E
Plasminogen activator inhibitor 2	PAI2	Ē
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	E
Plasminogen activator, Urokinase	UPA; PLAU	E
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Platelet glutaminase	GLS	T
Platelet glycoprotein 1b, alpha	GP1BA	
Platelet glycoprotein 1b, beta	GP1BB	i
Platelet glycoprotein 1b, gamma	GP1BG	
Platelet glycoprotein IX	GP9	
Platelet glycoprotein V	GP5	;
Platelet monamine oxidase	0.0	Ť
Platelet-activating factor acetylhydrolase 1B	PAFAH1B1 or	
	LIS1	1
Platelet-activating factor acetylhydrolase 2	PAFAH2	. 1
Platelet-activating factor receptor	PAFR	
Poly (ADP-ribose) synthetase	PARS	Ė
Polycystic kidney and hepatic disease 1	PKHD1	. T
Polycystin 1	PKD1	Ť
Polycystin 2	PKD2	T
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1	N
Potassium voltage-gated channel E1	KCNE1	N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	N
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)		•
Prekallikrein		1
Procollagen N-protease	·	Ë
Progesterone receptor (RU486 binding	PGR	G
receptor)		Ū
Pro-melanin-concentrating hormone	PMCH	G
Proopiomelanocortin	POMC	N
Prostaglandin (PG) D synthase,	PGDS	E
hematopoietic		
Prostaglandin E2 receptor		
Prostaglandin-endoperoxidase synthase 2	PTGS2	Ġ
Protease inhibitor 1		Ť
Protease nexin 2	PN2	Ė
Protective protein for beta-galactosidase	PPGB	Ē
Protein C	'PROC	Ī
Protein C inhibitor	PCI	I
Protein S	PROS1	i
Prothrombin precursor	F2	i

Protoporphyrinogen oxidase Purine nucleoside phosphorylase Purinergic receptor P1A1 Purinergic receptor P1A2	PPOX NP	EENN
Purinergic receptor P1A3 Purinergic receptor P2X, 1 Purinergic receptor P2X, 2 Purinergic receptor P2X, 3	P2RX1 P2RX2 P2RX3	N N N
Purinergic receptor P2X, 4 Purinergic receptor P2X, 5 Purinergic receptor P2X, 6	P2RX4 P2RX5 P2RX6	N N
Purinergic receptor P2X, 7 Purinergic receptor P2Y, 1	P2RX7 P2RY1	N N N
Purinergic receptor P2Y, 11 Purinergic receptor P2Y, 2 Pyruvate carboxylase	P2RY11 P2RY2 PC	N N E
Pyruvate decarboxylase Pyruvate kinase Radixin	PDHA PKLR RDX	EES
Renin Replication factor C Retinoic acid receptor, alpha	REN RFC2 RARA	EEG
Retinoic acid receptor, beta Retinoic acid receptor, gamma Retinoid X receptor, alpha Retinoid X receptor, beta	RARB RARG RXRA RXRB	GGG
Retinoid X receptor, beta Retinoid X receptor, gamma Rhesus blood group, CcEe antigens Rhesus blood group, D antigen	RXRG RHCE RHD	G G T
Rhesus blood group-associated glycoprotein Ribosomal protein S19 RIGUI	RHAG RPS19 RIGUI	T T E
S100 calcium-binding protein A1 S100 calcium-binding protein A2 S100 calcium-binding protein A3	S100A1 S100A2 S100A3	G N N
S100 calcium-binding protein A4 S100 calcium-binding protein A5 S100 calcium-binding protein A6	\$100A5 \$100A4 \$100A5 \$100A6	N N N
S100 calcium-binding protein A7 S100 calcium-binding protein A8 S100 calcium-binding protein A9	\$100A0 \$100A7 \$100A8 \$100A9	NNN
S100 calcium-binding protein B S100 calcium-binding protein P SA homolog	S100A9 S100B S100P SAH	2 2 2 0
SAP (SLAM-associated protein) Secretase, alpha Secretase, beta Secretase, gamma	SH2D1A	G - N N N
		. 4

Selectin E	SELE	N
Selectin L	SELL	N
Selectin P	SELP	N
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4.	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Serum amyloid A	SAA	T
Serum amyloid P	SAP	Ť
Sjoegren (Sjogren) syndrome antigen A1	SSA1	i
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ň
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1,	SCNN1G	N
gamma		• •
Sodium channel, voltage gated, type IV,	SCN4A	N
alpha polypeptide		
Sodium channel, voltage gated, type V, alpha	SCN5A	Ν
polypeptide		
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		
Solute carrier family 1 (glutamate	SLC1A1	T
transporter), member 1		
Solute carrier family 1 (glutamate	SLC1A2	T
transporter), member 2		
Solute carrier family 10 (sodium/bile acid	SLC10A1	Τ
cotransporter family),member 1		
Solute carrier family 10 (sodium/bile acid	SLC10A2	Ţ
cotransporter family),member 2		•
Solute carrier family 12, member 1	SLC12A1	T
Solute carrier family 12, member 2	SLC12A2	Т
Solute carrier family 12, member 3	SLC12A3	Т
Solute carrier family 2 (facilitated glucose	SLC2A1	Т
transporter), member 1		
Solute carrier family 2 (facilitated glucose	SLC2A2	T
transporter), member 2		
Solute carrier family 2 (facilitated glucose	SLC2A3	Т
transporter), member 3		
Solute carrier family 2 (facilitated glucose	SLC2A4	Т

transporter), member 4		
Solute carrier family 2 (facilitated glucose	SLC2A5	Т
transporter), member 5	OLOL/ (O	'
Solute carrier family 21, member 2	SLC21A2	Т
Solute carrier family 21, member 3	SLC21A3	Ť
Solute carrier family 22, member 5	SLC22A5	Ť
Solute carrier family 3 (facilitated glucose	SLC3A1	·Ť
transporter), member 1		'
Solute carrier family 4 (anion exchanger),	SLC4A1	Т
member 1		•
Solute carrier family 4 (anion exchanger),	SLC4A2	Т
member 2		
Solute carrier family 4 (anion exchanger),	SLC4A3	Т
member 3		
Solute carrier family 5 (sodium/glucose	SLC5A1	Т
transporter), member 1		
Solute carrier family 5 (sodium/glucose	SLC5A2	Τ
transporter), member 2		
Solute carrier family 5 (sodium/glucose	SLC5A5	T
transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	T
Solute carrier family 6 (GAMMA-	SLC6A1	Т
AMINOBUTYRIC ACID transporter), member	•	
Solute carrier family 6 (neurotransmitter	SLC6A3	_
transporter, dopamine), member 3	SECOAS	T
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2	SECOAL	•
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4	•	'
Solute carrier family 8 (sodium/calcium	SLC8A1	Т
exchanger), member 1		•
Sonic hedgehog, SHH	SHH	G
Sorcin	SRI	Т
Spectrin alpha	SPTA1	S
Spectrin beta	SPTB	S
Sphingomyelinase	SMPD1	Ε
Stem cell factor	SCF ***	G
·	SRD5A1	Ε
•	SRD5A2	E
	STAR	Т
•	SCP2	T
, ,	SDH1	Ε
	SDH2	Ε
Succinate thiokinase	0004	E
·	SOD1	E
·	SOD3	E G
Surfeit 1	SURF1	G

Synapsin 1a & 1b	SYN1	N
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle amine transporter	SVAT	N
Synaptobrevin 1	SYB1	
Synaptobrevin 2	SYB2	N
Synaptogyrin	3162	N
Synaptophysin	SYP	N
Synaptosomal-associated protein, 25KD		N
Synaptotagmin 1	SNAP25	N
Synaptotagmin 2	SYT1	N
Syntaxin 1	SYT2	N
Talin	STX1	Ν
	TLN	G
T-BOX 1	TBX1	G
T-BOX 3	TBX3	G
TEK, tyrosine kinase, endothelial	TEK	Ε
Terminal deoxynucleotidyltransferase	TDT	1
Tetranectin	TNA	Т
Thiolase, perioxisomal	•	Ε
Thiopurine S-methyltransferase	TPMT	Ε
Thrombin receptor	F2R	Ī
Thrombomodulin	THBD	i
Thrombopoietin	THPO	Ġ
Thrombospondin	THBS1	Ğ
Thromboxane A synthase 1	TBXAS1	Ĭ
Thromboxane A2	TXA2	i
Thromboxane A2 receptor	TBXA2R	i
Thy-1 T-cell antigen	THY1	i
Thymic humoral factor		1
Thymopoietin	TMPO	Ġ
Thymosin		
Thyroid hormone receptor, alpha	THRA	-
Thyroid hormone receptor, beta	THRB	G
TIE receptor tyrosine kinase	TIE-1	G
Tip-associated protein	TAP	G
Tissue inhibitor of metalloproteinase 1,	 .	1
TIMP1	TIMP1	Ε
Tissue inhibitor of metalloproteinase 2,	TIMOO	_
TIMP2	TIMP2	E
	TIME ADD	
Tissue inhibitor of metalloproteinase 3, TIMP3	TIMP3	Ε
	 .	
Tissue inhibitor of metalloproteinase 4,	TIMP4	Ε
TIMP4		
Topoisomerase I		Ε
Torticollis, keloids, cryptorchidism and renal	TKCR	G
dysplasia gene		
Transcobalamin 2, TCN2	TCN2	T
Transcription factor 2, hepatic	TCF2	G
Transferrin	TF	Ğ

Transferrin receptor Transforming growth factor, beta 2 Transforming growth factor, beta induced Transforming growth factor, beta receptor 2 Translocation in renal carcinoma on chromosome 8 gene	TFRC TGFB2 TGFBI TGFBR2 TRC8	G G G G
Transthyretin	TTR	Т
Triosephosphate isomerase	TPI1	Ε
Tropomyosin 1 alpha	TPM1	S
Troponin C		S
Troponin I	TNNI3	S
Troponin T2, cardiac	TNNT2	S
Tuberous sclerosis 1	TSC1	G
Tuberous sclerosis 2	TSC2	G
Tumour necrosis factor (TNF) receptor	TRAF1	ı
associated factor 1	TD 1 50	
Tumour necrosis factor (TNF) receptor	TRAF2	İ
associated factor 2	TDAEO	
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	ì
Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4	IIVAI 4	1
Tumour necrosis factor (TNF) receptor	TRAF5	ī
associated factor 5		•
Tumour necrosis factor (TNF) receptor	TRAF6	ſ
associated factor 6		•
Tumour necrosis factor alpha	TNFA	ı
Tumour necrosis factor alpha receptor	TNFAR	1
Tumour necrosis factor beta	TNFB	1
Tumour necrosis factor beta receptor	TNFBR	F
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tyrosine hydroxylase	TH	Ε
Ubiquitin		G
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G
UDP-glucose pyrophosphorylase	the same and the s	Ε
UDP-glucuronosyltransferase 1	ugt1d; UGT1	E
UDP-glucuronosyltransferase 2	UGT2	Ε
Uncoupling protein 1	LICES	T
Uncoupling protein 3 Undulin 1	UCP3	T
Uridinediphosphate(UDP)-galactose-4-	COL14A1 GALE	S E
epimerase	GALE	_
Uroporphyrinogen III synthase	UROS	Е
Vacuolar proton pump, subunit 1	VPP1	N
· · · · · · · · · · · · · · · · · · ·	VPP3	N
· · · · · · · · · · · · · · · · · · ·	VEGF	G
in a second seco		J

VIP	N
VIPR	N
	G
VIM	Ī
	S
VDR	Ğ
VHL	G
VWF	Т
WRN	G
WASP, THC	Ī
WHSC1	G
WFS1	S
XDH	E
ZIC3	S
	VIPR VIM VDR VHL VWF WRN WASP, THC WHSC1 WFS1 XDH

- 246.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 245.
- 247.A set according to claim 245 or 246 in which a minority of said probes for listed genes are absent.
- 248.A set according to claim 245 or 246 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 249.A set according to claim 245 or 246 in which a limited number of probes are replaced by probes for non-listed genes.
- 250.A set of probes for a core group of genes according to any of claims 245 to 249 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 251.A set according to any of claims 245 to 250 consisting of probes for members of a sub-group of the core group.
- 252.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 253.A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 254.A set according to any preceding claim in which said probes are mass. electrostatic or fluorescence tagged probes.
- 255.A set according to claim 252 or 253in which said substrate is a semiconductor microchip.

- 256.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 257. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 258. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 259.A medical device including a set according to any of claims 245 to 257 for use in an array for detection of differential gene expression levels.
- 260. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 245) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 245 and 247 to 257 and relating the probe hybridisation pattern to said variations.
- 261. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 246) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 246 to 257 and relating the probe interaction pattern to said variations.
- 262. Use of a set or device according to any of claims 245 to 257 for the prognosis and management of patients suffering from or at risk of experiencing the symptoms or consequences of cardiovascular disease, dysfunction and/or damage.
- 263.Use of a set or device according to any of claims 245 to 257 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 264. Use of a set or device according to any of claims 245 to 257 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 265. Use of a set or device according to any of claims 245 to 257 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 266. Use of a set or device according to any of claims 245 to 257 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 267. Use of a set or device according to any of claims 245 to 257 for the development of new strategies of therapeutic intervention and in clinical trials.
- 268. Use of a set or device according to any of claims 245 to 257 for construction of and generation of algorithms for patient and healthcare management.
- 269. Use of a set or device according to any of claims 245 to 257 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 270. Use of a set or device according to any of claims 245 to 257 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 271. Use of a set or device according to any of claims 245 to 257 for predicting optimum configuration/management of thereapeutic intervention.

- 272. A method according to claim 260 or 261 in which the identification of gene variants is indicative of a higher risk of developing the symptoms or consequences of cardiovascular disease, dysfunction and/or damage for the patient or individual.
- 273. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop the symptoms or consequences of cardiovascular disease, dysfunction and/or damage which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from the symptoms or consequences of cardiovascular disease, dysfunction and/or damage;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the symptoms or consequences of cardiovascular disease, dysfunction and/or damage;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 245 to 251;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing the symptoms or consequences of cardiovascular disease, dysfunction and/or damage.
- 274. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 273.
- 275. A method according to any of claims 260, 261, 273 and 274 wherein at least one step is computer-controlled.
- 276. An assay suitable for use in a method according to any of claims 260, 261, 273 and 274; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 245 to 251 in a biological sample.
- 277. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms or consequences of cardiovascular disease, dysfunction and/or damage; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 245 or 247 to 251 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing the symptoms or consequences of cardiovascular disease, dysfunction and/or damage.
- 278. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms or consequences of cardiovascular disease, dysfunction and/or damage; said kit comprising:
 - means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 246 to 251 in an expressedprotein-containing human sample;

- ii) reagents for use in the detection process
- readout indicating the probability of a patient or individual developing the symptoms or consequences of cardiovascular disease, dysfunction and/or damage.
- 279. A set of probes according to claim 245, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 280.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to dysfunction, damage or disease of the gastrointestinal tract; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

GASTROINTESTINAL GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	E
17beta hydroxysteroid dehydrogenase 1	HSD17B1	Ē
17beta hydroxysteroid dehydrogenase 3	HSD17B3	Ē
17beta hydroxysteroid dehydrogenase 4	HSD17B4	Ε
17beta hydroxysteroid oxidoreductase		E
2,3-bisphosphoglycerate mutase	BPGM	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	Ε
6-phosphofructo-2-kinase	PFKFB1	Ē
Acetoacetyl 1-CoA-thiolase	ACAT1	E
Acetoacetyl 2-CoA-thiolase	ACAT2	E
Acetyl CoA carboxylase	ACC ·	E
Acetyl CoA carboxylase alpha	ACACA	E
Acetylcholine receptor, nicotinic, gamma	CHRNG	Ν
Acetylcholinesterase	ACHE	Ε
Acid phosphatase 2, lysosomal	ACP2	E
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Actin, beta	ACTB	S
Actin, gamma 2	ACTG2	Š
Acyl CoA dehydrogenase, long chain	ACADL	Ē

	Acyl CoA dehydrogenase, medium chain Acyl CoA dehydrogenase, short chain Acyl CoA dehydrogenase, very long chain Acyl CoA synthetase, long chain, 1 Acyl CoA synthetase, long chain, 2 Acyl CoA synthetase, long chain, 4 Acyl malonyl condensing enzyme Acyl-CoA thioesterase Adaptin, beta 3A Adenine phosphoribosyltransferase Adenomatous polyposis coli tumour supressor	ACADM ACADS ACADVL LACS1 LACS2 ACS4 ADTB3A APRT APC	EEEEEETTG
	gene	450544	
	Adenosine receptor A1	ADORA1	N
	Adenosine receptor A2A	ADORACA	N
	Adenosine receptor A2B Adenosine receptor A3	ADORA2B	N
	Adenylate cyclase 1	ADORA3 ADCY1	N
	Adenylate cyclase 2	ADCY1	E
	Adenylate cyclase 3	ADCY3	E E
	Adenylate cyclase 4	ADCY4	E
	Adenylate cyclase 5	ADCY5	E
	Adenylate cyclase 6	ADCY6	E
	Adenylate cyclase 7	ADCY7	E
	Adenylate cyclase 8	ADCY8	E
	Adenylate cyclase 9	ADCY9	E
	Adrenergic receptor, alpha1	ADRA1	N
	Adrenergic receptor, alpha2	ADRA2	N
	Adrenergic receptor, beta1	ADRB1	N
	Adrenergic receptor, beta2	ADRB2	N
	Adrenergic receptor, beta3	ADRB3	Ν
	Adrenocorticotrophic hormone (ACTH)	ACTHR	G
	receptor		
	Alanine aminotransferase		T
	Alanine-glyoxylate aminotransferase	AGXT	E
	Albumin, ALB	ALB	T
	Alcohol dehydrogenase 1	ADH1	E
	Alcohol dehydrogenase 2	ADH2	Ε
	Alcohol dehydrogenase 3	ADH3	E
	Alcohol dehydrogenase 4	ADH4	E
	Alcohol dehydrogenase 5 Alcohol dehydrogenase 6	ADH5	E
	Alcohol dehydrogenase 7	ADH6 ADH7	E
	Aldehyde dehydrogenase 1	ALDH1	E
•	Aldehyde dehydrogenase 2	ALDH2	E
	Aldehyde dehydrogenase 5	ALDH5	E
	Aldehyde dehydrogenase 6	ALDH6	E
	Aldehyde dehydrogenase 7	ALDH7	E
	Aldolase A	ALDOA	E
		· ····	_

Aldolase B	ALDOB		Ε
Aldolase C	ALDOC		E
Aldose reductase			T
Aldosterone receptor	MLR		Ġ
Alkaline phosphatase, liver/bone/kidney	ALPL		T
Alpha 2 macroglobulin	A2M		i
alpha1-antitrypsin	Pi		Ė
alpha2-antiplasmin	PLI		Ē
alpha-actinin 2	ACTN2		G
alpha-actinin 3	ACTN3		G
alpha-amylase			E
alpha-dextrinase			E
alpha-Galactosidase A	GLA		E
alpha-ketoglutarate dehydrogenase	32 ,		E
alpha-L-Iduronidase	IDUA		E
Aminomethyltransferase	AMT		
Aminopeptidase P	XPNPEP2		E
Amphiregulin	AREG		G
Amylo-1,6-glucosidase	AGL		E
Angiopoietin 1	ANGPT1		G
Angiopoietin 2	ANGPT2	,	
Angiotensin converting enzyme	ACE, DCP1		G E
Angiotensin receptor 1	AGTR1		T
Angiotensin receptor 2	AGTR1		
Angiotensinogen	AGT		T
Antidiuretic hormone receptor	ADHR		E
Antithrombin III	AT3		T
AP-2, alpha	TFAP2A		E
AP-2, beta	TFAP2B		G
AP-2, gamma	TFAP2C		G
Apolipoprotein A I	APOA1		G
Apolipoprotein A II	APOA1		T
Apolipoprotein B	APOB		T
Apolipoprotein C1	APOC1		T
Apolipoprotein C2	APOC1		T
Apolipoprotein C3	APOC2		1
Apolipoprotein D	APOD		T
Apolipoprotein E	APOE		T
Apolipoprotein H	APOE		T
Aquaporin 1	APOH AQP1		T
Aquaporin 2			Ţ
Arginine vasopressin	AQP2		T
	AVP		N
Arginine vasopressin receptor 1A	AVPR1A		N
Arginine vasopressin receptor 1B	AVPR1B		N
Arginine vasopressin receptor 2	AVPR2		N
Arginosuccinate lyase	ASL		E
Arginosuccinate synthetase	ASS		E
Aryl hydrocarbon receptor nuclear translocator	ARNI		T

A milaulfatana A	ADCA	_
Arylsulfatase A	ARSA	Ε
Arylsulfatase B	ARSB	Ε
Aspartate transaminase	101	T
Aspartylglucosaminidase	AGA	Ε
Ataxia telangiectasia gene, AT	ATM	G
ATP/ADP translocase		Ε
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
Autoimmune regulator, AIRE	AIRE	i
Azoospermia factor 1	AZF1	Ġ
beta 2 microglobulin	B2M	Ī
beta-galactosidase	GLB1	Ė
beta-glucosidase, neutral		E
beta-Glucuronidase	GUSB	Ē
beta-ketoacyl reductase	3332	E
Bile acid coenzyme A: amino acid N-	BAAT	E
acyltransferase		=
Bile salt export pump	BSEP, PFIC2	
Bile salt-stimulated lipase	CEL	T
Bilirubin UDP-glucuronosyltransferase	CEL	E
Biliverdin reductase		Ε
		T
Bradykinin receptor B1		ļ
Bradykinin receptor B2	BOKOLA	1
Branched chain keto acid dehydrogenase E1,	BCKDHA	Ε
alpha polypeptide		
Branched chain keto acid dehydrogenase E1,	BCKDHB	E
beta polypeptide		
Brush border guanylyl cyclase		Ε
Ca(2+) transporting ATPase, fast twitch	ATP2A1	T
Ca(2+) transporting ATPase, slow twitch	ATP2A2	T
Cadherin E	CDH1	G
Cadherin EP		G
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calcitonin/Calcitonin gene-related peptide	CALCA	Ň
alpha	10 and 10	• •
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	N
subunit		1.4
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)	CACIVATE	14
Calcium channel, voltage-dependent, Alpha-	CACNA1C	
1C	CACNATO	N
Calcium channel, voltage-dependent, Alpha-	CACNAID	
1D	CACNA1D	N
	CACNIAAE	
Calcium channel, voltage-dependent, Alpha-	CACNA1E	N
1E (CACNL1A6)		

	•	
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	N
Calcium channel, voltage-dependent, Beta 1	CACNB1	N
Calcium channel, voltage-dependent, Beta 3	CACNB3	
Calcium channel, voltage-dependent, Beta 3	CACNG2	N
Neuronal, Gamma	CACING2	N
Calcium channel, voltage-dependent, T-type		N.
Calcium sensing receptor	CASR	N T
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin dependant kinase	OALINO	T
Calmodulin-dependant kinase II	CAMK2A	Ġ
Calnexin	CANX	G
Canalicular multispecific organic anion	CMOAT	T
transporter	CIVICAT	•
Carbamoylphosphate synthetase 1	CPS1	Ε
Carbamoylphosphate synthetase 2	CPS2	E
Carbonic anhydrase 3	CA3	E
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	E
Carboxylesterase 1	CES1	E
Carboxypeptidase	CPN	E
Carnitine acylcarnitine translocase	CACT	E
Carnitine palmitoyltransferase I	CPT1A	E
Carnitine palmitoyltransferase II	CPT2	E
Carnitine transporter protein	CDSP, SCD	T
Cartilage-hair hypoplasia gene	CHH	N
Catalase	CAT	ï
Cathepsin B		Ė
Cathepsin D		Ē
Cathepsin E		E
Cathepsin G	CTSG	Ē
Cathepsin H		E
Cathepsin K	CTSK	E
Cathepsin L		Ē
Cathepsin S	r · · · · · · · · · · · · · · · · · · ·	E
CD1	CD1	ī
CD4	CD4	i
Cell adhesion molecule, intercellular, ICAM	ICAM1	Ġ
Cell adhesion molecule, leukocyte-endothelial,	LECAM1	Ğ
LECAM (CD62)		_
Cell adhesion molecule, liver, LCAM	LCAM	G
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	PECAM1	G
con darrodon molocalo, platolot-chidotilollal,	i = O/ MVI I	J

PECAM		
Cell adhesion molecule, vascular, VCAM	VCAM1	_
c-erbB2	ERBB2	G
c-erbB3	ERBB3	G
c-erbB4	ERBB4	G
Ceruloplasmin precursor	CP	G E
Chemokine receptor CCR2	CCR2	
Chemokine receptor CCR3	CCR3	
Chemokine receptor CCR5	CCR5	-
Chemokine receptor CXCR4	CXCR4	1
Chitotriosidase	chit	É
Chloride channel 5	CLCN5	S
Chloride channel KB	CLCNKB	S
Cholecystokinin	CCK	N
Cholecystokinin B receptor	CCKBR	N
Cholestasis, progressive familial intrahepatic 1	FIC1	G
gene		G
Cholesterol ester hydroxylase		Ε
Choline acetyltransferase	CHAT	Ē
Chromogranin A	CHGA	Ğ
Chymotrypsinogen		Ë
Citrate synthase		Ē
Clathrin		Ŧ
Clusterin	CLU	Ġ
CoA transferase		Ē
Cockayne syndrome gene, CKN1	CKN1	Ğ
Collagen I alpha 1	COL1A1	S
Collagen I alpha 2	COL1A2	S
Collagen il alpha 1	COL2A1	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	S
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	S
Collagen IV alpha 6	COL4A6	S
Collagen IX alpha 2	COL9A2, EDM2	S S S
Collagen IX alpha 3	COL9A3	S
Collagen receptor	COLR	S
Collagen V alpha 1	COL5A1	S
Collagen V alpha 2	COL5A2	S
Collagen VI alpha 1	COL6A1	S
	COL6A2	S
A !!	COL6A3	S
	COL7A1	S
• • • • • • • • • • • • • • • • • • • •	COL10A1	S
A 11	COL11A1	S
Collagen XI alpha 2	COL11A2	S

Collagen XVII alpha 1 Colony-stimulating factor 1 Complement component C1 inhibitor Complex I Complex II Complex III	COL17A1 CSF1 C1NH	S G I E E
Corticotrophin-releasing hormone Corticotrophin-releasing hormone receptor C-reactive protein CRP	CRH CRHR1	T T I
Creb binding protein Cu2+ transporting ATPase beta polypeptide	CREBBP ATP7B	G E
Cubilin	CUBN	Ť
Cyclic AMP-dependent protein kinase	PKA	E
Cyclic nucleotide phosphodiesterase 1B	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	E
Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A	PDE2A3	E
Cyclic nucleotide phosphodiesterase 3B	PDE3A PDE3B	E
Cyclic nucleotide phosphodiesterase 4A	PDE4A	E
Cyclic nucleotide phosphodiesterase 4C	PDE4C	. E
Cyclic nucleotide phosphodiesterase 5A	PDE5A	E
Cyclic nucleotide phosphodiesterase 6A	PDE6A	Ē
Cyclic nucleotide phosphodiesterase 6B	PDE6B	· E
Cyclic nucleotide phosphodiesterase 7	PDE7	E
Cyclic nucleotide phosphodiesterase 8	PDE8	E
Cyclic nucleotide phosphodiesterase 9A	PDE9A	E
Cyclin F	CCNF	G
Cyclin-dependent kinase 2	CDK2	G
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN1C	G
Cyclooxygenase 1	COX1	E
Cyclooxygenase 2	COX2	E
CYP11A1 CYP11B1	CYP11A1	E
CYP11B1	CYP11B1	E
CYP17	CYP11B2 CYP17	. E
CYP19	CYP19	, E
CYP1A1	CYP1A1 ···	· · E
CYP1A2	CYP1A2	E
CYP1B1	CYP1B1	Ē
CYP21	CYP21	Ē
CYP24	CYP24	Ē
CYP27	CYP27	Ε.
CYP27B1	PDDR	E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	Ε
CYP2A3	CYP2A3	E
CYP2A6V2	CYP2A6V2	E

CYP2A7	CYP2A7	E
CYP2B6	CYP2B6	E
CYP2C18	CYP2C18	
CYP2C19	CYP2C19	
CYP2C8	CYP2C8	E
CYP2C9	CYP2C9	
CYP2D6	CYP2D6	E
CYP2E1	CYP2E1	E
CYP2F1	CYP2F1	E
CYP2J2	CYP2J2	Ε
CYP3A3		E E E
CYP3A4	CYP3A3	느
CYP3A5	CYP3A4	
	CYP3A5	Ε
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	Ε
CYP4B1	CYP4B1	
CYP4F2	CYP4F2	Ε
CYP4F3	CYP4F3	Ε
CYP51	CYP51	
CYP5A1	CYP5A1	Ε
CYP7A	CYP7A	Ε
CYP8	CYP8	Ε
Cystathionase	CTH	Ε
Cystathione beta synthase	CBS	Ε
Cysteine-rich intestinal protein		T
Cystic fibrosis transmembrane conductance	CFTR	Ν
regulator, CFTR		
Cystinosin	CTNS	T
Cytidine deaminase	CDA	Ε
Cytidine-5-prime-triphosphate synthetase	CTPS	Ε
Cytochrome a		Ε
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	CSBP1	Ī
binding protein 1		•
Cytokine-suppressive antiinflammatory drug-	CSBP2	1
binding protein 2		•
DAX1 nuclear receptor	DAX1	
Deleted in colorectal carcinoma	DCC	Ġ
Delta aminolevulinate dehydratase	ALAD	E
Delta(4)-3-oxosteroid 5-beta-reductase		E
Delta-7-dehydrocholesterol reductase	DHCR7	E
Dihydrodiol dehydrogenase 1	DDH1	E
Dihydrolipoamide branched chain transacylase		
Dihydrolipoamide dehydrogenase	DLD	N
DNA glycosylases		N
Dopamine beta hydroxylase	DBH	E
Dopamine receptors D1		E
Dobarrille recebiols D.I.	DRD1	Ν

Dopamine receptors D2 Dopamine receptors D3 Dopamine receptors D4 Dopamine receptors D5 Dynamin Dynein Dystrophia myotonica	DRD2 DRD3 DRD4 DRD5 DNM1 DM, DMPK	N N N N G G E
Dystrophia myotonica, atypical Dystrophin EB1	DM2 DMD	E S G
Elastase 1 Elastase 2 Electron-transfering-flavoprotein alpha Electron-transfering-flavoprotein beta Electron-transferring flavoprotein dehydrogenase	ELAS1 ELAS2 ETFA ETFB ETFDH	E E T T E
Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Enolase Enoyl CoA isomerase Enoyl CoA reductase Enteric lipase	EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB ENO1	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
Enterokinase Ephrin receptor tyrosine kinase A Ephrin receptor tyrosine kinase B Epidermal growth factor Epidermal growth factor receptor Erythrocyte membrane protein band 4.1 Erythropoietin Excision repair complementation group 2 protein	PRSS7, ENTK EPHA EPHB EGF EGFR EPB41 EPO ERCC2	- EGGGGS-E
Excision repair complementation group 2	ERCC3	Ε
protein Eyes absent 1 Faciogenital dysplasia Factor 1 (No. one) Factor B, properdin	EYA1 FGD1, FGDY F1	G T I
Factor D Factor H Factor I (letter I) Factor IX Factor V Factor VII	HF1 IF F3 F9 F5	

·		
Factor VIII	F8	1
Factor X	F10	i
Factor XI	F11	i
Factor XII	F12	i
Factor XIII A & B	F13A & F13B	
FADH dehydrogenase	7 1071 07 100	E
Fanconi anemia, complementation group A	FANCA	T
Fanconi anemia, complementation group C	FANCC	Ť
Fanconi anemia, complementation group D	FANCD	Ť
Fatty acid binding proteins FABP1	. 7	Ť
Fatty acid binding proteins FABP2	FABP2	Ť
Fatty acid binding proteins FABP3	176.2	Ť
Fatty acid binding proteins FABP4		Ť
Fatty acid binding proteins FABP5		Ť
Fatty acid binding proteins FABP6		Ť
Ferritin, H subunit		Ť
Ferritin, L subunit	FTL	Ť
Fibroblast growth factor	FGF1	Ġ
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	Ğ
Flavin-containing monooxygenase 1	FMO1	E
Flavin-containing monooxygenase 2	FMO2	Ē
Flavin-containing monooxygenase 3	FMO3	Ē
Flavin-containing monooxygenase 4	FMO4	E
Folic acid receptor	FOLR	G
Follicle stimulating hormone receptor	FSHR, ODG1	Ğ
Follicle stimulating hormone, FSH	FSHB	Ğ
Forkhead transcription factor 10	FKHL10	Ğ
Forkhead transcription factor 14	FKHL14	Ğ
Fragile site, folic acid type, rare, fra(X) A	FRAXA	Ň
Fructose-1,6-diphosphatase	FBP1	Ε
Fucosidase alpha-L-1	FUCA1	E
Fucosidase alpha-L-2		Ε
Fucosyltransferase 2	FUT2	Т
Fucosyltransferase 3	FUT3	T
Fumarase	FH 1	Ε
G/T mismatch binding protein	GTBP, MSH6	G
Galactocerebrosidase	GALC	Ε
Galactose 1-phosphate uridyl-transferase	GALT	Ε
Galactosyltransferase 1	GT1	G
Galactosyltransferase, alpha 1,3	GGTA1	G
Galactosyltransferase, beta 3	B3GALT	G
Galanin	GAL	N
Galanin receptor	GALNR1	Ν
Gamma-glutamyltransferase 1	GGT1	Т
Gamma-glutamyltransferase 2	GGT2	T

Gap junction protein beta 1 Gastric inhibitory polypeptide GIP Gastric inhibitory polypeptide receptor, GIPR Gastric Intrinsic factor, GIF Gastric lipase, LIPF Gastrin Gastrin releasing peptide Gastrin releasing peptide receptor Glial-cell derived neurotrophic factor (GDNF)	GJB1 GIP GIPR GIF GAS GRP GRPR	TTTETGTTN
receptor Glial-cell derived neurotrophic factor, GDNF	GDNF	
Glucagon receptor	GCGR	N
Glucagon synthase	COOK	G T
Glucagon-like peptide receptor 1	GLP1R	G
Glucokinase	GCK	E
Glucose-6-phosphatase	G6PC	Ē
Glucose-6-phosphatase translocase	G6PT1	
Glucose-6-phosphate dehydrogenase	G6PD	Ē
Glucosidase, acid alpha	GAA	E
Glutamate dehydrogenase	GLUD1	E E E
Glutamine synthase		Ε
Glutamine transporter		T
Glutathione	GSH	T
Glutathione peroxidase, GPX2	GPX2	Ε
Glutathione S-transferase, GSTZ1	GSTZ1	E
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	Ε
Glycerol kinase	GK	_
Glycinamide ribonucleotide (GAR)	GART	E
transformylase	JAKI	Ę
Glycine dehydrogenase	GLDC	Ε
Glycogen branching enzyme	GBE1	E
Glycogen phosphorylase	PYGL	E
Glycogen synthase 1 (muscle)	GLYS1	E
Glycogen synthase 2 (liver)	GYS2	Ε
Glycosyltransferases, ABO blood group	ABO	Ε
Gonadotropin releasing hormone	GNRH	G
Goosecoid GSC	• • •	G
Growth arrest-specific homeobox	GAX	G
Growth hormone receptor	GHR	G
Guanylin	GUCA2	T
H(+), K(+) - ATPase	ATP4B	N
Haem oxygenase Haemoglobin alpha 1	UDA4	T
Haemoglobin alpha 2	HBA1	T
Haemoglobin beta	HBA2	T
Haemoglobin beta Haemoglobin delta	HBB HBD	T
Haemoglobin gamma A	HBG1	T
raomogioom gamina A	11001	Т

Haemoglobin gamma B Haemoglobin gamma G	HBG2 HBGG	T T
Heat shock protein, HSP60	11000	1
Heat shock protein, HSP70		;
Heat shock protein, HSP90		1
Heat shock protein, HSPA1		;
Heat shock protein, HSPA2		1
Heparan sulfamidase		Ė
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	I
Hepatic nuclear factor-3-beta	HNF3B	Ė
Hepatic nuclear factor-4-alpha	HNF4A	Ē
Hepatitis B virus integration site 1	HVBS1	Ī
Hepatitis B virus integration site 2	HVBS6	i
Hepatocyte growth factor	HGF	Ġ
Hermansky-pudlak syndrome gene	HPS	T
Hexokinase 1	HK1	Ė
Hexokinase 2	HK2	Ē
Hexosaminidase A	HEXA,TSD	Ē
Hexosaminidase B	HEXB	. E
Histamine receptors, H1		N
Histamine receptors, H2		N
Histamine receptors, H3		N
Histatin 1		1
Histatin 2		1
Histatin 3	HTN3	1
HLA-B associated transcript 1	BAT1	1
HMG-CoA lyase	HMGCL	E
HMG-CoA reductase	HMGCR	E
HMG-CoA synthase	HMGCS2	Ε
Holocarboxylase synthetase	HLCS	E
Hormone-sensitive lipase	HSL	Ε
Hydroxyacyl glutathione hydrolase	HAGH	Е
Hypoxanthine-guanine	HPRT	Е
phosphoribosyltransferase, HGPRT		
IC7 A and B	100	
Iduronate 2 sulphatase	IDS	E
Immunoglobulin E (IgE) reponsiveness gene	IGER	
Immunoglobulin E (IgE) serum concentration	IGES	
regulator gene	101100	•
Immunoglobulin gamma (IgG) 2	IGHG2	!
Immunoglobulin heavy mu chain Immunoglobulin J polypeptide	IGHM	!
Immunoglobulin s polypeptide Immunoglobulin kappa constant region	IGJ	1
Immunoglobulin kappa constant region Immunoglobulin kappa variable region	IGKC	!
Inhibin, alpha	IGKV INHA	1
Inhibin, beta A	INHBA	G
Inhibin, beta B	INHBB	G G
month bota b	מסוואוו	G

Inhibin, beta C	INHBC	G
Inositol 1,4,5-triphosphate receptor 3	ITPR3	G
Insulin	INS	Ğ
Insulin receptor	INSR	G
Insulin-like growth factor 1	IGF1	Ğ
Insulin-like growth factor 1 receptor	IGF1R	Ğ
Insulin-like growth factor 2	IGF2	Ğ
Insulin-like growth factor 2 receptor	IGF2R	Ğ
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 3	ITGB3	G
Integrin beta 6	ITGB6	G
Integrin, alpha M	ITGAM	G
Integrin, alpha X	ITGAX.	G
Inter-alpha-trypsin inhibitor, IATI		E
Interferon alpha	IFNA1	1
Interferon beta	IFNB	i
Interferon gamma	IFNG	. [
Interferon gamma receptor 1	IFNGR1	1
Interferon gamma receptor 2	IFNGR2	. 1
Interferon regulatory factor 1	IRF1	1
Interferon regulatory factor 4	IRF4	1
Interleukin(IL) 1 receptor	IL1R	1
Interleukin(IL) 1, alpha	IL1A	1.
Interleukin(IL) 1, beta	IL1B	1
Interleukin(IL) 10	IL10	1
Interleukin(IL) 10 receptor	IL10R	I
Interleukin(IL) 11	IL11	I
Interleukin(IL) 11 receptor	IL11R	1
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	i
Interleukin(IL) 13	IL13	1
Interleukin(IL) 13 receptor	IL13R	1
Interleukin(IL) 2	IL2	l
Interleukin(IL) 2 receptor, alpha	IL2RA	ļ
Interleukin(IL) 2 receptor, gamma	IL2RG	1
Interleukin(IL) 3	IL3	l l
Interleukin(IL) 3 receptor	IL3R	
Interleukin(IL) 4	IL4	!
Interleukin(IL) 4 receptor	IL4R	į.
Interleukin(IL) 5	IL5	l
Interleukin(IL) 5 receptor	IL5R	!
Interleukin(IL) 6	IL6	<u> </u>
Interleukin(IL) 6 receptor	IL6R	l
Interleukin(IL) 7	IL7	!
Interleukin(IL) 7 receptor	IL7R	!
Interleukin(IL) 8	IL8	!
Interleukin(IL) 8 receptor	IL8R	i

IL9 IL9R IL1RN, IL1RA IAPP IVD KAK3 KAL1 KHK KNG	
	G
	G G
	G
	J
LCAT	Ε
LEP	G
LEPR	G
LST-1	1
	1
LTA4S	Ε
	1
LTB4S	Ε
	1
LTC4S	Ε
	1
LHX1	G
LMX1B	G
	Ε
	1
	T
HDLDT1	T
	T
	T
	Т
	Т
LKY	T
1 55 4	_
	G
	E
1 7 /	ı
	IL9R IL1RN, IL1RA IAPP IVD KAK3 KAL1 KHK KNG LAMA3 LAMB3 LAMC2 LAMM LAMR1 LTBP2 LCAT LEP LEPR LEPR LST-1 LTA4S LTB4S LTC4S LHX1

MAD (mothers against decapentaplegic,	MADH4	G
Drosophila) homologue 4		
MADS box transcription-enhancer factor 2A		G
MADS box transcription-enhancer factor 2B	MEF2B	G
MADS box transcription-enhancer factor 2C	MEF2C	G
MADS box transcription-enhancer factor 2D	MEF2D	G
Malonyl CoA decarboxylase		Ē
Malonyl CoA transferase		Ē
Maltase-glucoamylase		E
Mannosidase, alpha B lysosomal	MANB	E
Marenostrin	MEFV	Ť
MAX-interacting protein 1	MXI1	Ġ
MEK kinase, MEKK		E
Melanocortin 2 receptor	MC2R	T
Melanocortin 4 receptor	MC4R	, T
Menin	MEN1	
Metallothionein	MEINI	G
Mevalonate kinase	MVK	T
MHC Class I: A	INIAK	Ę
MHC Class I: B		!
MHC Class I: C		l l
		!
MHC Class I: LMP-2, LMP-7	ADOD TADA	!
MHC Class I: Tap1	ABCR, TAP1	ŀ
MHC Class II: DP	HLA-DPB1	1
MHC Class II: DQ	?	l l
MHC Class II: DR		1
MHC Class II: Tap2	TAP2, PSF2	ı
MHC Class II:Complementation group A	MHC2TA	1
MHC Class II:Complementation group B	rfxank	I
MHC Class II:Complementation group C	RFX5	1
MHC Class II:Complementation group D	RFXAP	i
Microsomal triglyceride transfer protein	MTP	T
Mitochondrial trifunctional protein, alpha	HADHA	E
subunit		
Mitochondrial trifunctional protein, beta subu	nit HADHB	Ε
Molybdenum cofactor synthesis 1	MOCS1	E
Molybdenum cofactor synthesis 2	MOCS2	E
Monoamine oxidase A	MAOA	E.
Monoamine oxidase B	MAOB	E
Motilin	MLN	G
Msh homeobox homolog 2	MSX2	G
Mucin 18	MUC18	Ť
Mucin, MUC2		Ť
Mucin, MUC5AC		Ť
Mucin, MUC6		Ť
Mucolipidoses	GNPTA	Ė
Mulibrey nanism	MUL	T
Muscarinic receptor, M1	CHRM1	N
the second of th	# · · · · · · · ·	1.4

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Muscarinic receptor, M2	CHRM2	· N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	N
Muscle phosphorylase	PYGM	E
Mutated in colorectal cancers, MCC	MCC	G
MutL homolog 1	MLH1	G
MutS homolog 2	MSH2	G
MutS homolog 3	MSH3	G
Myoglobin		T
Myosin 15	MYO15	Š
Myosin 5A	MYO5A	S
Myosin 6	MYO6	S
Myosin 7A	MYO7A	S
Myosin, cardiac	MYH7	S
Myosin, light chain 2	MYL2	S
Myosin, light chain 3	MYL3	9
Myotubularin	MTM1	S
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3	G
Na+/H+ exchanger 1	NHE1	T
Na+/H+ exchanger 2	NHE2	Ť
Na+/H+ exchanger 3	NHE3	Ť
Na+/H+ exchanger 4	NHE4	Ť
Na+/H+ exchanger 5	NHE5	Ť
Na+coupled glucose/galactose transporter		Ť
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	Ė
N-acetylglucosamine-6-sulfatase	GNS	Ē
N-acetylglucosaminidase, alpha	NAGLU	Ē
NADH dehydrogenase		Ē
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS1	Ē
protein 1		_
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS4	Ε
protein 4		_
NADH dehydrogenase (ubiquinone)	NDUFV1	Е
flavoprotein 1		
NADH-cytochrome b5 reductase	DIA1	Ε
NADPH-dependent cytochrome P450	POR	Ē
reductase		_
NB6		1
Nephrolithiasis 2	NPHL2	Ť
Nephronophthisis 1	NPHP1	Ť
Nephronophthisis 2	NPHP2	Ť
Nephrosis 1	NPHS1	Ť
Nerve growth factor	NGF	Ġ
Nerve growth factor receptor	NGFR	G

	•	
Neuraminidase sialidase	NEU	Т
Neurofibromin 1	NF1	Ġ
Neurofibromin 2	NF2	G
Neurokinin A	NKNA	· N
Neurokinin B	NKNB	N
Neurotensin	NTS	N
Neurotensin receptor	NTSR1	N N
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL	
Oncogene ERB	"\DE	1
Oncogene ERB2		G
Oncogene ERBA		G
Oncogene ERBAL2		G
Oncogene GLI1	GLI	G
Oncogene GLI2	GLI2	G
Oncogene GLI3	GLI3	G
Oncogene met	MET	G
Oncogene myb	MYB	. G
Oncogene myc	MYC	G
Oncogene n-myc	MYC	G
Oncogene ret	DET	G
Oncogene r-myc	RET	G
Oncogene sis	DDCED	G
Oncogene spi1	PDGFB	G
		G
Oncogene src	VDACO.	G
Oncogene v-Ki-ras2 Orexin	KRAS2	G
	OX OY4D	G
Orexin 1 receptor	OX1R	G
Orexin 2 receptor	OX2R	G
Ornithine transcarbamoylase	OTC, NME1	E
Osteopontin	OPN	G
Paired box homeotic gene 2	PAX2	G
Paired box homeotic gene 3	PAX3	G
Paired box homeotic gene 6	PAX6	G
Paired box homeotic gene 8	PAX8	G
Palmitoyl-protein thioesterase	PPT	T
Pancreatic amylase		E
Pancreatic colipase		"" T
Pancreatic lipase	. PNLIP	E E E
Pancreatic lipase related protein 1	PLRP1	E
Pancreatic lipase related protein 2	PLRP2	E
Paraoxonase PON1	PON1	Ε
Paraoxonase PON2	PON2	Ε
Paraoxonase PON3		Ε
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	G
Parathyroid hormone-like hormone	PTHLH	G

Parvalbumin	PVALB		G
Patched (Drosophila) homolog, PTCH	PTCH		Ğ
Pepsin			T
Pepsinogen			Ε
Peptidases A			T
Peptidases B			Ť
Peptidases C			Ť
Peptidases D	PEPD		T
Peptidases E			T
Peptidases S			T
Peroxidase, salivary	SAPX		Ė
Peroxisomal membrane protein 1	PXMP1		s
Peroxisomal membrane protein 3	PXMP3		T
Peroxisome biogenesis factor 1	PEX1		T
Peroxisome biogenesis factor 19	PEX19		Ť
Peroxisome biogenesis factor 6	PEX6		Ť
Peroxisome biogenesis factor 7	PEX7		T
Peroxisome receptor 1	PXR1		Ť.
Phenylalanine monooxygenase	-		E
Phosphatase & tensin homolog	PTEN		G
Phosphate regulating gene with homologies to	PHEX		G
endopeptidases on the X chromosome			
Phosphoenolpyruvate carboxykinase	PCK1		E
Phosphofructokinase, liver	PFKL		Ē
Phosphofructokinase, muscle	PFKM		Ē
Phosphoglucomutase			Ē.
Phosphoglucose isomerase	GPI		E
Phosphoglycerate kinase 1	PGK1		E
Phosphoglycerate mutase 2	PGAM2		E
Phospholipase A2, group 10	PLA2G10		1
Phospholipase A2, group 1B	PLA2G1B		Ī
Phospholipase A2, group 2A	PLA2G2A		1
Phospholipase A2, group 2B	PLA2G2B		i
Phospholipase A2, group 4A	PLA2G4A		ì
Phospholipase A2, group 4C	PLA2G4C		i
Phospholipase A2, group 5	PLA2G5		Ì
Phospholipase A2, group 6	PLA2G6		i
Phospholipase C alpha			•
Phospholipase C beta			ĺ
Phospholipase C delta	PLCD1		1
Phospholipase C epsilon			i
Phospholipase C gamma	PLCG1		I
Phosphomannomutase 2	PMM2		G
Phosphomannomutase-2	PMM2		Т
Phosphomannose isomerase-1, PMI1	MPI		Ť
Phosphoribosyl pyrophosphate synthetase	PRPS1		E
Phosphorylase kinase deficiency, liver	PHK		Ē
Phosphorylase kinase, alpha 1 (muscle)	PHKA1	•	F

Phosphorylase kinase, alpha 2	PHKA2	Ε
Phosphorylase kinase, beta	PHKB	Е
Phosphorylase kinase, delta		E
Phosphorylase kinase, gamma 2	PHKG2	E
Plasminogen	PLG	E
Plasminogen activator inhibitor 1	PAI1	E
Plasminogen activator inhibitor 2	PAI2	E
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	Ε
Plasminogen activator, Urokinase	UPA; PLAU	E
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Platelet monamine oxidase		Т
Platelet-activating factor receptor	PAFR	i
Polycystic kidney and hepatic disease 1	PKHD1	Т
Polycystin 1	PKD1	T
Polycystin 2	PKD2	Т
Polymorphonuclear elastase		T.
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	Ν
Potassium voltage-gated channel E1	KCNE1	N
Prekallikrein		1
Preproenkephalin	PENK	Ν
Preproglucagon	GCG;GLP1; GLP2	G
Preproglucagon		Т
Preproinsulin		T
Procollagen N-protease		Ε
Proline dehydrogenase	PRODH	Ε
Proline-rich protein BstNI subfamily 1	PRB1	S
Proline-rich protein BstNI subfamily 3	PRB3	S S
Proline-rich protein BstNl subfamily 4	PRB4	S
Prolyl-4-hydroxylase		Ε
Pro-melanin-concentrating hormone	PMCH	G
Proopiomelanocortin	POMC	Ν
Prosaposin	PSAP	N
Prostacyclin synthase		1
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	İ
Prostaglandin D - DP receptor	•• • • • •	- -
Prostaglandin E1 receptor		1
Prostaglandin E2 receptor		1
Prostaglandin E3 receptor		1
Prostaglandin F - FP receptor		- 1
Prostaglandin F2 alpha receptor		j
Prostaglandin I2 receptor		T
Prostaglandin IP receptor		1
Protease inhibitor 1	•	Т
Protective protein for beta-galactosidase	PPGB	Ε
Protein C	PROC	. 1

Protein C inhibitor Protein kinase B	PCI	1
Protein S	PRKB	
	PROS1	ı
Protein tyrosine phosphatase, non-receptor	PTPN12	G
type 12	F 2	
Prothrombin precursor	F2	1
Pterin-4-alpha-carbinolamine	PCBD	
Pyruvate carboxylase	PC	Ε
Pyruvate decarboxylase Pyruvate kinase	PDHA	Ε
Quinoid dihydropteridine reductase	PKLR	Ε
* * *	QDPR	Ε
Renal glutaminase Renin		T
	REN	Ε
Replication factor C	RFC2	Ε
Retinoblastoma 1	RB1	G
Retinol binding protein 1		Т
Retinol binding protein 2		· T
Retinoschisis, X-linked, juvenile	RS	G
RIGUI	RIGUI	G
SA homolog	SAH	G
Salivary amylase, AMY1	0.100	Т
SAP (SLAM-associated protein)	SH2D1A	i
Secretin Secretin Secretin	SCT	Т
Secretin receptor, SCTR	SCTR	Т
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	Ν
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	Ν
Serotonin receptor, 5HT2C	HTR2C	Ν
Serotonin receptor, 5HT3	HTR3	Ν
Serotonin receptor, 5HT4	HTR4	· N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	Ν
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma	SCNN1G	Ν
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		
Solute carrier family 10 (sodium/bile acid	SLC10A1	T
cotransporter family),member 1		
Solute carrier family 10 (sodium/bile acid	SLC10A2	Т
cotransporter family),member 2		
Solute carrier family 12, member 1	SLC12A1	T

Solute carrier family 12, member 2	SLC12A2	-	Т
Solute carrier family 12, member 3	SLC12A3		T
Solute carrier family 14, member 2	SLC14A2		
Solute carrier family 15 (H+/peptide	SLC15A1		Ţ
	SECTOAT	·	Τ
transporter, intestinal), member 1	01.04540		
Solute carrier family 15 (H+/peptide	SLC15A2	٦	Γ
transporter, kidney), member 2			
Solute carrier family 16 (monocarboxylate	SLC16A1	٦	Γ
transporter), member 1			
Solute carrier family 16 (monocarboxylate	SLC16A7	. 7	Γ
transporter), member 7			
Solute carrier family 17, member 1	SLC17A1	7	Γ
Solute carrier family 17, member 2	SLC17A2	T	Γ
Solute carrier family 2 (facilitated glucose	SLC2A1		Γ
transporter), member 1	•	·	
Solute carrier family 2 (facilitated glucose	SLC2A2	Ť	_
transporter), member 2		•	
Solute carrier family 2 (facilitated glucose	SLC2A3	Т	-
transporter), member 3	, · · -	•	
Solute carrier family 2 (facilitated glucose	SLC2A4	Т	-
transporter), member 4		•	
Solute carrier family 2 (facilitated glucose	SLC2A5	т	-
transporter), member 5	02027.10	•	
Solute carrier family 21, member 2	SLC21A2	Т	
Solute carrier family 21, member 3	SLC21A3	Ť	
Solute carrier family 22, member 1	SLC22A1	ή	
Solute carrier family 22, member 2	SLC22A2		
Solute carrier family 22, member 5	SLC22A5	T	
Solute carrier family 3 (facilitated glucose	SLC3A1	T	
transporter), member 1	SECSAT	Т	
Solute carrier family 4 (anion exchanger),	SI CAAA	-	
member 1	SLC4A1	Т	
	CI C440	~	
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	Т	
	CLOAAO	_	
Solute carrier family 4 (anion exchanger),	SLC4A3	1	
member 3	01.0544		
Solute carrier family 5 (sodium/glucose	SLC5A1	Т	
transporter), member 1			
Solute carrier family 5 (sodium/glucose	SLC5A2	T	
transporter), member 2			
Solute carrier family 5 (sodium/glucose	SLC5A5	Т	
transporter), member 5			
Solute carrier family 5, member 3	SLC5A3	Т	
Solute carrier family 6 (GAMMA-	SLC6A1	Т	
AMINOBUTYRIC ACID transporter), member	1		
Solute carrier family 6 (neurotransmitter	SLC6A3	Т	
transporter, dopamine), member 3			
Solute carrier family 6 (neurotransmitter	SLC6A2	Т	

01.004.0	
	Т
SLC7A1	T
SLC7A2	Т
•	
SLC7A7	Т
SST	Ν
SSTR1	Ν
SSTR2	G
SSTR3	Ν
SSTR4	Ν
SSTR5	N
SMPD1	Ε
SRD5A1	Ē
SRD5A2	E
	T
	N
	E
•	E
Si	T
	Ė
	G
	G
	S
TBP	G
	G
	G
	G
15/10	E
F2R	ī
	Ġ
	-
TKCD	E
	G
	_
	E
TONO	T
	T
	G
	G
	G
	G
	G
	G
IGFBR2	G
	SSTR1 SSTR2 SSTR3 SSTR4 SSTR5 SMPD1 SRD5A1 SRD5A2 SCP2 SI SOD1 SURF1 TLN TBP TBX1 TBX2 TBX3 F2R THPO TBXAS1 TAP TKCR TCN2 TCF1 TCF2 TF TFRC TGFB2 TGFBI

Transglutaminase 4 Transketolase Transketolase-like 1 Translocation in renal carcinoma on	TGM4 TKT TKTL1 TRC8	·	G E G
chromosome 8 gene Transthyretin	TTR		-
Trehalase	HIN		T
Triosephosphate isomerase	TPI1		T E
Trypsin inhibitor	11 11		E
Trypsinogen 1	TRY1		E
Trypsinogen 2	TRY2		Ē
Trypsinogen activation peptide	******		T
Tuberous sclerosis 1	TSC1		Ġ
Tuberous sclerosis 2	TSC2		G
Tumour necrosis factor (TNF) receptor	TRAF1		G
associated factor 1	11001		ŧ
Tumour necrosis factor (TNF) receptor	TRAF2		ı
associated factor 2			'
Tumour necrosis factor (TNF) receptor	TRAF3		i
associated factor 3			•
Tumour necrosis factor (TNF) receptor	TRAF4	•	1
associated factor 4			
Tumour necrosis factor (TNF) receptor	TRAF5		ı
associated factor 5			
Tumour necrosis factor (TNF) receptor	TRAF6		1
associated factor 6			
Tumour necrosis factor alpha	TNFA		i
Tumour necrosis factor alpha receptor	TNFAR		1
Tumour necrosis factor beta	TNFB		1
Tumour necrosis factor beta receptor	TNFBR		1
Tumour protein p53	TP53, P53		G
Tumour protein p63	TP63		G
Tumour suppresssor gene DRA	DRA		ì
Tyrosinase	TYR		Ε
UDP-glucose pyrophosphorylase			E
UDP-glucuronosyltransferase 1	ugt1d, UGT1		Ε
UDP-glucuronosyltransferase 2	UGT2		E
Uridinediphosphate(UDP)-galactose-4-	GALE	• • • • •	Ε
epimerase			
Uroporphyrinogen decarboxylase	UROD		E
Uroporphyrinogen III synthase	UROS		Ε
Vasoactive intestinal polypeptide	VIP		Ν
Vasoactive intestinal polypeptide receptor	VIPR		Ν
Vasoinhibitory peptide		•	G
Villin			S
Von Hippel-Lindau gene	VHL		G
Von Willebrand factor	VWF		Т
Wiskott-Aldrich syndrome protein	WASP, THC		1

Wolf-Hirschhorn syndrome candidate 1 gene Wolfram syndrome 1 gene	WHSC1 WFS1	G S
Xanthine dehydrogenase	XDH	Ε
Xeroderma pigmentosum, complementation group A	XPA	Ε
Xeroderma pigmentosum, complementation group B	XPB	Ε
Xeroderma pigmentosum, complementation group C	XPC	Ε
Xeroderma pigmentosum, complementation		Ε
group D		
Xeroderma pigmentosum, complementation group E		Е
Xeroderma pigmentosum, complementation group F	XPF	Ε
Xeroderma pigmentosum, complementation	ERCC5	E
group G		
Zinc finger protein 3	ZIC3	S

- 281.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 280.
- 282.A set according to claim 280 or 281 in which a minority of said probes for listed genes are absent.
- 283.A set according to claim 280 or 281 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 284.A set according to claim 280 or 281 in which a limited number of probes are replaced by probes for non-listed genes.
- 285.A set of probes for a core group of genes according to any of claims 280 to 284 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 286.A set according to any of claims 280 to 285 consisting of probes for members of a sub-group of the core group.
- 287.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 288. A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.

- 289.A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 290.A set according to claim 287 or 288 in which said substrate is a semiconductor microchip.
- 291.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 292. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 293. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 294.A medical device including a set according to any of claims 280 to 292 for use in an array for detection of differential gene expression levels.
- 295. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 280) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 280 and 282 to 292 and relating the probe hybridisation pattern to said variations.
- 296. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 281) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 281 to 292 and relating the probe interaction pattern to said variations.
- 297. Use of a set or device according to any of claims 280 to 292 for the prognosis and management of patients suffering from or at risk of experiencing the symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract.
- 298. Use of a set or device according to any of claims 280 to 292 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 299. Use of a set or device according to any of claims 280 to 292 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 300. Use of a set or device according to any of claims 280 to 292 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 301. Use of a set or device according to any of claims 280 to 292 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 302. Use of a set or device according to any of claims 280 to 292 for the development of new strategies of therapeutic intervention and in clinical trials.
- 303. Use of a set or device according to any of claims 280 to 292 for construction of and generation of algorithms for patient and healthcare management.
- 304. Use of a set or device according to any of claims 280 to 292 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations.

- 305. Use of a set or device according to any of claims 280 to 292 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 306. Use of a set or device according to any of claims 280 to 292 for predicting optimum configuration/management of thereapeutic intervention.
- 307. A method according to claim 295 or 296 in which the identification of gene variants is indicative of a higher risk of developing dysfunction, damage or disease of the gastrointestinal tract or of experiencing the symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract for the patient or individual.
- 308. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract;
- obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract;
- iii) analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 280 to 286;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract.
- 309. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 308.
- 310. A method according to any of claims 295, 296, 308 and 309 wherein at least one step is computer-controlled.
- 311. An assay suitable for use in a method according to any of claims 295, 296, 308 and 309; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 280 to 286 in a biological sample.
- 312. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract; said kit comprising:
 - means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 280 or 282 to 286 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract.

- 313. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 281 to 286 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing symptoms and consequences of dysfunction, damage or disease of the gastrointestinal tract.
- A set of probes according to claim 280, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 315. A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to dysfunction, damage or disease of the respiratory system; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

RESPIRATORY GENE LIST	HUGO gene symbol	Protein function
11beta hydroxysteroid dehydrogenase 2	HSD11B2	E
2,3-bisphosphoglycerate mutase	BPGM	E
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	· E
Acetoacetyl 1-CoA-thiolase	ACAT1	E
Acetoacetyl 2-CoA-thiolase	ACAT2	Ε
Acetyl CoA synthase		Ε
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	E
Aconitase		E
Acyl CoA dehydrogenase, long chain	ACADL	E
Acyl CoA dehydrogenase, medium chain	ACADM	Ε
Acyl CoA dehydrogenase, short chain	ACADS	Ε
Acyl CoA dehydrogenase, very long chain	ACADVL	Ε

Adaptin, beta 3A Adenosine deaminase Adenosine receptor A1 Adenosine receptor A2A Adenosine receptor A2B Adenosine receptor A3 Adenosine receptor A3 Adenylate cyclase 1 Adenylate cyclase 2 Adenylate cyclase 3 Adenylate cyclase 4 Adenylate cyclase 5 Adenylate cyclase 5 Adenylate cyclase 6 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 9 Adrenergic receptor, alpha1 Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH)	ADTB3A ADA ADORA1 ADORA2A ADORA2B ADORA3 ADCY1 ADCY2 ADCY3 ADCY4 ADCY5 ADCY6 ADCY7 ADCY8 ADCY7 ADCY8 ADCY9 ADRA1 ADRA2 ADRA1 ADRA2 ADRB1 ADRB2 ADRB3 ACTHR	T = Z Z Z Z = E = E = E = E = E = Z Z Z Z
receptor Albumin, ALB Alcohol dehydrogenase 1 Alcohol dehydrogenase 2 Alcohol dehydrogenase 3 Alcohol dehydrogenase 4 Alcohol dehydrogenase 5 Alcohol dehydrogenase 6 Alcohol dehydrogenase 7 Aldolase A Aldolase B Aldolase C Aldosterone receptor Alpha 2 macroglobulin Alpha1-antichymotrypsin alpha2-antiplasmin alpha2-antiplasmin alpha-actinin 2	ALB ADH1 ADH2 ADH3 ADH4 ADH5 ADH6 ADH7 ALDOA ALDOB ALDOC MLR A2M AACT PI PLI ACTN2	7 下巴巴巴巴巴巴巴巴巴 6 一 巴巴巴马
alpha-actinin 3 alpha-Galactosidase A alpha-ketoglutarate dehydrogenase Aminopeptidase P Amphiregulin Androgen receptor Angiopoietin 1 Angiopoietin 2 Angiotensin converting enzyme	ACTN3 GLA XPNPEP2 AREG AR ANGPT1 ANGPT2 ACE, DCP1	G

Angiotensin receptor 1	AGTR1	Т
Angiotensin receptor 2	AGTR2	Ť
Angiotensinogen	AGT	E
Annexin 1	ANX 1	1
Antidiuretic hormone receptor	ADHR	Ť
Antithrombin III	AT3	
Apolipoprotein E	APOE	E
Arginase	ARG1	Ţ
_ ,		Ε
Arginine vasopressin	AVP	N
Arginine vasopressin receptor 1A	AVPR1A	Ν
Arginine vasopressin receptor 1B	AVPR1B	Ν
Arginine vasopressin receptor 2	AVPR2	Ν
Arginosuccinate lyase	ASL	Ε
Arylsulfatase D	ARSD	Ε
Arylsulfatase E	ARSE	Ε
Arylsulfatase F	ARSF	Ε
Aspartate transaminase		Т
Ataxia telangiectasia gene, AT	ATM	G
ATP/ADP translocase		E
Atrial natriuretic peptide	ANP	Ğ
Atrial natriuretic peptide receptor A	NPR1	Ğ
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	Ğ
beta-galactosidase	GLB1	E
beta-Glucuronidase	GUSB	Ē
Biotinidase	BTD	E
Bloom syndrome protein	BLM	G
Bradykinin receptor B1	DEM	l
Bradykinin receptor B2		1
Butyrylcholinesterase	BCHE	
C1 inhibitor	BCHE	E
Cadherin E	CD114	E
	CDH1	G
Cadherin EP		G
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calcitonin receptor /Calcitonin gene-related	CALCR	Ν
peptide receptor		
Calcitonin/Calcitonin gene-related peptide	CALCA	N
alpha		
Calcium channel, voltage-dependent, alpha	CACNA1F	N
1F subunit		
Calcium channel, voltage-dependent, Alpha-	CACNA1B	Ν
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
10		-
Calcium channel, voltage-dependent, Alpha-	CACNA1D	Ν
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	Ν
- · · · · · · · · · · · · · · · · · · ·		

47 (04 0) 11 14 1			
1E (CACNL1A6)			
Calcium channel, voltage-dependent, Alpha-	CACNA2		Ν
2/delta			
Calcium channel, voltage-dependent, Beta 1			Ν
Calcium channel, voltage-dependent, Beta 3			Ν
Calcium channel, voltage-dependent,	CACNG2		Ν
Neuronal, Gamma			
Calcium channel, voltage-dependent, T-type			Ν
Calmodulin 1	CALM1		G
Calmodulin 2	CALM2		G
Calmodulin 3	CALM3		G
Calnexin	CANX		G
Carbonic anhydrase 3	CA3		E
Carbonic anhydrase 4	CA4		Ε
Carbonic anhydrase, alpha	CA1		Ε
Carbonic anhydrase, beta	CA2		Ε
Carnitine acetyltransferase	CRAT		Ε
Carnitine acylcarnitine translocase	CACT		Ε
Catalase	CAT		ł
Cathepsin B			Ε
Cathepsin D			Ε
Cathepsin E			Ε
Cathepsin G	CTSG		Ε
Cathepsin H			Ε
Cathepsin K	CTSK		Ε
Cathepsin L			Ε
Cathepsin S			Ε
CD1	CD1		1
CD4	CD4		l
Cell adhesion molecule, intercellular, ICAM	ICAM1		G
Cell adhesion molecule, leukocyte-	LECAM1		G
endothelial, LECAM (CD62)			
Cell adhesion molecule, liver, LCAM	LCAM		G
Cell adhesion molecule, neural, NCAM1	NCAM1		·G
Cell adhesion molecule, neural, NCAM120	NCAM120		G
Cell adhesion molecule, neural, NCAM2	NCAM2		G
Cell adhesion molecule, platelet-endothelial,	PECAM1		G
PECAM · · · · · · · · · · · · · · · · · · ·	3.44	e de la composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della composition della comp	
Cell adhesion molecule, vascular, VCAM	VCAM1		G
Chemokine receptor CXCR4	CXCR4		- 1
Chitotriosidase	chit		E
Cholecystokinin	CCK	•	Ν
Cholecystokinin B receptor	CCKBR		Ν
Choline acetyltransferase	CHAT		Ε
Citrate synthase			Ε
Coenzyme Q (CoQ)/ubiquinone			Ε
Collagen I alpha 1	COL1A1		E S S
Collagen I alpha 2	COL1A2		S

Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	S
Collagen IV alpha 4	COL4A4	S S
Collagen IV alpha 5	COL4A5	Š
Collagen IV alpha 6	COL4A6	S
Collagen IX alpha 2	COL9A2, EDM2	S
Collagen IX alpha 3	COL9A3	S
Collagen receptor	COLR	S
	COL5A1	S
Collagen V alpha 1	COL5A2	S
Collagen V alpha 2	COL6A1	S
Collagen VI alpha 1	COL6A2	S
Collagen VI alpha 2	COL6A3	S
Collagen VI alpha 3	COL7A1	3
Collagen VII alpha 1		S
Collagen X alpha 1	COL10A1	S S
Collagen X alpha 1	COL11A1	5
Collagen XI alpha 2	COL11A2	S
Collagen XVII alpha 1	COL17A1	S
Colony-stimulating factor 1	CSF1	G
Colony-stimulating factor 1 receptor	CSF1R	G
Colony-stimulating factor 2	CSF2	G
Colony-stimulating factor 2 alpha receptor	CSF2RA	G
Colony-stimulating factor 2 beta receptor	CSF2RB	G
Colony-stimulating factor 3	CSF3	G
Colony-stimulating factor 3 receptor	CSF3R	G
Complement component C1 inhibitor	C1NH	l ,
Complement component C1qa	C1QA	!
Complement component C1qb	C1QB	
Complement component C1qg	C1QG	!
Complement component C1r	C1R	!
Complement component C1s	C1S	ı
Complement component C2	C2	i
Complement component C3	C3	1
Complement component C4A	C4A	
Complement component C4B	C4B	
Complement component C5	C5	ı
Complement component C6	C6	i
Complement component C7	C7	ı
Complement component C8	C8B	i
Complement component C9	C9	1
Complement component receptor 1	CR1	1
Complement component receptor 2	CR2	1
Complement component receptor 3	CR3	I
Complex I		Ε
Complex II		Ε

Complex III		_
Complex III		Ε
Complex V	MTATP6	E
Coproporphyrinogen oxidase	CPO	E
Corticotrophin-releasing hormone	CRH	E
Corticotrophin-releasing hormone receptor	CRHR1	T
Cortisol receptor	CKHKI	Ţ
C-reactive protein CRP		!
Creatine kinase – B and m	CKDE	1
Creb binding protein	CKBE	E
Cu2+ transporting ATPase alpha polypeptide	CREBBP	G
		E
Cyclic AMP-dependent protein kinase Cyclic nucleotide phosphodiesterase 1B	PKA PDE4D	E
	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	Ε
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	Ε
Cyclic nucleotide phosphodiesterase 3B	PDE3B	Ε
Cyclic nucleotide phosphodiesterase 4A	PDE4A	E
Cyclic nucleotide phosphodiesterase 4C	PDE4C	E
Cyclic nucleotide phosphodiesterase 5A	PDE5A	E
Cyclic nucleotide phosphodiesterase 6A	PDE6A	E
Cyclic nucleotide phosphodiesterase 6B	PDE6B	E
Cyclic nucleotide phosphodiesterase 7	PDE7	E
Cyclic nucleotide phosphodiesterase 8	PDE8	Ε
Cyclic nucleotide phosphodiesterase 9A	PDE9A	E
Cyclin-dependent kinase 2	CDK2	G
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	G
Cyclooxygenase 1 Cyclooxygenase 2	COX1	E
CYP11A1	COX2	E
CYP11B1		E
CYP11B2		E
CYP17		E
CYP19		Ε
CYP1A1		E
		E
· - ·		E
		Ε
		E
		E
		E
		E
		E
		E
		E
		E
		E
	CYP2B6	E
U1F2U10	CYP2C18	Ε

CYP2C19 CYP2C8 CYP2C9 CYP2D6 CYP2E1 CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4B1 CYP4F2	CYP2C19 CYP2C8 CYP2C9 CYP2D6 CYP2E1 CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3	
CYP4F3 CYP51	CYP51	E E
CYP5A1	CYP5A1	E
CYP7A	CYP7A	E
CYP8	CYP8	E
Cystathionase	CTH	Ē
Cystathione beta synthase	CBS	E
Cystic fibrosis transmembrane conductance	CFTR	N
regulator, CFTR		
Cytidine deaminase	CDA	Е
Cytidine-5-prime-triphosphate synthetase	CTPS	Ε
Cytochrome a		E
Cytochrome b-245 alpha	CYBA	E
Cytochrome b-245 beta	CYBB	E
Cytochrome b-5	CYB5	E
Cytochrome c		E
Cytochrome c oxidase, MTCO Cytokine-suppressive antiinflammatory drug-	CSBD1	. [
binding protein 1	COBFI	t
Cytokine-suppressive antiinflammatory drug-	CSBP2	ı
binding protein 2	005. 2	•
DAX1 nuclear receptor	DAX1	I
D-beta-hydroxybutyrate dehydrogenase		E
Delta 4-5 alpha-reductase	* * **	E.
Desmin	DES	S
Dihydrolipoamide dehydrogenase	DLD	N
DNA glycosylases		Ε
Dopamine beta hydroxylase	DBH	Ε
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	N
Dopamine receptors D5	DRD5	N
Dystrophin	DMD	S

Elastase 1	ELAS1	Ε
Elastase 2	ELAS2	Ε
Elastin	ELN	S
Electron-transfering-flavoprotein alpha	ETFA	Т
Electron-transfering-flavoprotein beta	ETFB	T
Electron-transferring flavoprotein	ETFDH	Ε
dehydrogenase		
Endothelin 1	EDN1	Ν
Endothelin 2	EDN2	Ν
Endothelin 3	EDN3	Ν
Endothelin converting enzyme	ECE1	N
Endothelin receptor type A	EDNRA	N
Endothelin receptor type B	EDNRB	N
Enolase	ENO1	E
Enoyl CoA hydratase	<u> </u>	E
Enoyl CoA isomerase		Ē
Enoyl CoA reductase		E
Enterokinase	PRSS7, ENTK	E
Ephrin receptor tyrosine kinase A	EPHA	G
Ephrin receptor tyrosine kinase B	EPHB	G
Epidermal growth factor	EGF	G
Epidermal growth factor receptor	EGFR	G
Epoxide hydrolase 1, microsomal	EPHX1	E
Estrogen receptor	ESR	G
EWS RNA-binding protein	EWSR1	
Eyes absent 1	EYA1	G G
Faciogenital dysplasia	FGD1, FGDY	T
Factor 1 (No. one)	F1	1
Factor B, properdin	ГІ	1
Factor D		ŀ
Factor H	1354	!
	HF1	l ·
Factor I (letter I)	IF	-
Factor III	F3	!
Factor IX	F9	1
Factor V	F5	!
Factor VII	F7	- 1
Factor VIII	F8	1
Factor X	F10	-
Factor XI	F11	ı
Factor XII	F12	- 1
Factor XIII A & B	F13A & F13B	1
Fc fragment of IgG, high affinity IA, receptor	FCGR1A	G
for		
Fc fragment of IgG, low affinity IIa, receptor	FCGR2A	G
for (CD32)		
Fc fragment of IgG, low affinity Illa, receptor	FCGR3A	G
for (CD16)		
Fibrillin 1	FBN1	G

Fibrinogen alpha	FGA	s
Fibrinogen beta	FGB	s
Fibrinogen gamma	FGG	Š
Fibroblast growth factor	FGF1	Ğ
Fibroblast growth factor receptor 1	FGFR1	Ğ
Fibroblast growth factor receptor 2	FGFR2	Ğ
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
Flightless-II, Drosophila homolog of	FLII	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Forkhead rhabdomyosarcoma gene	FKHR	G
Fructose-1,6-diphosphatase	FBP1	E
Furin	1 21 1	T
GABA receptor, alpha 1	GABRA1	N
GABA receptor, alpha 2	GABRA2	N
GABA receptor, alpha 3	GABRA3	N
GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	N
GABA receptor, beta 1	GABRB1	N
GABA receptor, beta 2	GABRB2	N
GABA receptor, beta 3	GABRB3	N
GABA receptor, gamma 1	GABRG1	N
GABA receptor, gamma 2	GABRG2	N
GABA receptor, gamma 3	GABRG3	N
GABA transaminase	ABAT	Ε
Galactocerebrosidase	GALC .	Ε
Galactosyltransferase 1	GT1	G
Galactosyltransferase, alpha 1,3	GGTA1	G
Galactosyltransferase, beta 3	B3GALT	G
Glucocorticoid receptor	GRL	G
Glucokinase	GCK	Ε
Glucosidase, acid alpha	GAA	Ε
Glutamate dehydrogenase	GLUD1	Ε
Glutamate receptor 1	GLUR1	Ν
Glutamate receptor 2	GLUR2	Ν
Glutamate receptor 3	GLUR3	Ν -
Glutamate receptor 4	GLUR4	Ν
Glutamate receptor 5	GLUR5	Ν
Glutamate receptor 6	GLUR6	Ν
Glutamate receptor 7	GLUR7	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	Ν
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	Ν
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
Glutathione	GSH	Т

	Glutathione peroxidase, GPX1	GPX1		Ε
	Glutathione peroxidase, GPX2	GPX2		Ē
	Glutathione reductase, GSR	GSR		
	Glutathione S-transferase mu 1, GSTM1	GSTM1		EEE
	Glutathione S-transferase mu 4, GSTM4			Ē
	Glutathione S-transferase theta 1, GSTT1	GSTT1		E
	Glutathione S-transferase theta 2, GSTT2	••••		E
	Glutathione S-transferase, GSTP1	GSTP1		E
	Glutathione S-transferase, GSTZ1	GSTZ1		
	Glutathione synthetase	GSS		E
	Glyceraldehyde-3-phosphate	GAPDH		E
	dehydrogenase, GAPDH			_
	Glycerol kinase	GK		Ε
	Glycinamide ribonucleotide (GAR)	GART		Ē
	transformylase		•	_
	GM2 ganglioside activator protein, GM2A	GM2A		E
	Growth arrest-specific homeobox	GAX		G
	Guanylyl cyclase			Ē
	Haemoglobin alpha 1	HBA1		T
	Haemoglobin alpha 2	HBA2		Ť
	Haemoglobin beta	HBB		T
	Haemoglobin delta	HBD		T
	Haemoglobin gamma A	HBG1		T
	Haemoglobin gamma B	HBG2		Т
	Haemoglobin gamma G	HBGG		Т
	Heat shock protein, HSP60			ı
	Heat shock protein, HSP70			1
	Heat shock protein, HSP90			1
	Heat shock protein, HSPA1			- 1
	Heat shock protein, HSPA2			I
	Heparin binding epidermal growth factor	HBEGF		G
	Heparin Cofactor II	HCF2		1
	Hermansky-pudlak syndrome gene	HPS	•	Т
	Hexokinase 1	HK1		E
	Hexokinase 2	HK2		Ε
	Hexosaminidase A	HEXA,TSD		Ε
	Histamine receptors, H1			Ν
	Histamine receptors, H2	* * * * * * * * * * * * * * * * * * *	***	Ν.
	Histamine receptors, H3	•	·	Ν
	HMG-CoA lyase	HMGCL		Ε
	HMG-CoA reductase	HMGCR		Ε
	HMG-CoA synthase	HMGCS2		Ε
	Holocarboxylase synthetase	HLCS		Ε
	Hyaluronidase			T
	Hypoxia inducible factor 1	HIF1A		Ε
	Hypoxia inducible factor 2			Ε
•	Immunoglobulin E (IgE) reponsiveness gene	IGER		1
	Immunoglobulin E (IgE) serum concentration	IGES		1

regulator gene	101100	
Immunoglobulin gamma (IgG) 2	IGHG2	1
Insulin	INS	G
Insulin receptor	INSR	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 5	ITGB5	G
Integrin beta 6	ITGB6	G
Integrin, alpha M	ITGAM	G
Inter-alpha-trypsin inhibitor, IATI		Е
Interferon alpha	IFNA1	1
Interferon beta	IFNB	ĺ
Interferon gamma	IFNG	1
Interferon gamma receptor 1	IFNGR1	·
Interferon gamma receptor 2	IFNGR2	i
Interferon regulatory factor 1	IRF1	·
Interferon regulatory factor 4	IRF4	
Interleukin(IL) 1 receptor	IL1R	
Interleukin(IL) 1, alpha	IL1A	i
Interleukin(IL) 1, beta	IL1B	;
Interleukin(IL) 10	IL10	t I
	IL10R	I.
Interleukin(IL) 10 receptor	IL11	
Interleukin(IL) 11	IL11R	
Interleukin(IL) 11 receptor		. !
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	!
Interleukin(IL) 13	IL13	!
Interleukin(IL) 13 receptor	IL13R	!
Interleukin(IL) 2	IL2	l .
Interleukin(IL) 2 receptor, alpha	IL2RA	1
Interleukin(IL) 2 receptor, gamma	IL2RG	l
Interleukin(IL) 3	IL3	l
Interleukin(IL) 3 receptor	IL3R	Ī
Interleukin(IL) 4	IL4	~,
Interleukin(IL) 4 receptor	IL4R	1
Interleukin(IL) 5	IL5	l
Interleukin(IL) 5 receptor	IL5R	1
Interleukin(IL) 6	IL6	· [
Interleukin(IL) 6 receptor	IL6R	1
Interleukin(IL) 7	IL7	l
Interleukin(IL) 7 receptor	IL7R	i
Interleukin(IL) 8	IL8	Ì
Interleukin(IL) 8 receptor	IL8R	i
Interleukin(IL) 9	IL9	· i
` '		•

Interleukin(IL) 9 receptor Interleukin(IL) receptor antagonist 1	IL9R	1
Isocitrate dehydrogenase	IL1RN, IL1RA	. [
Kallikrein 3	KAK3	E
Kininogen, High molecular weight	KNG	i
Kynureninease		Ė
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	Ğ
Latent transforming growth factor-beta	LTBP2	Ğ
binding protein 2		
Lecithin-cholesterol acyltransferase	LCAT	Ε
Leptin	LEP	G
Leptin receptor	LEPR	G
Leukotriene A4 hydrolase		1
Leukotriene A4 synthase	LTA4S	Ε
Leukotriene B4 receptor		1
Leukotriene B4 synthase	LTB4S	Ε.
Leukotriene C4 receptor		1
Leukotriene C4 synthase	LTC4S	E
Leukotriene D4/E4 receptor		i
LIM homeobox protein 1	LHX1	G
Lipoamide dehydrogenase	OGDH	E
Lipoprotein lipase	LPL	l
Lipoprotein receptor, Low Density	LDLR	Ţ
Lipoprotein, High Density	HDLDT1	I
Lipoprotein, Intermediate Density Lipoprotein, Low Density 1		T
Lipoprotein, Low Density 2		Ţ
Lipoprotein, Cow Density Lipoprotein, Very Low Density	VIDID	T
Lipoxygenase	VLDLR	T
Low density lipoprotein receptor-related	LRP	E
protein precursor	LINE	Т
Lymphoid enhancer-binding factor	LEF-1	G
Lysosomal acid lipase	LIPA	G E
Lysozyme	LYZ	. [
MAD (mothers against decapentaplegic,	MADH4	Ġ
Drosophila) homologue 4	1717	J
Malate dehydrogenase, mitochondrial	MDH2	Ε
Malonyl CoA transferase		E
Mannose binding protein	MBP	ī
Mannosidase, alpha B lysosomal	MANB	Ė
Mannosidase, beta A lysosomal	MANBA	Ē
Matrix Gla protein	MGP	Ğ
Matrix metalloproteinase 1	MMP1	E
Matrix metalloproteinase 10	MMP10	Ē

,		
Matrix metalloproteinase 11	MMP11	Ε
Matrix metalloproteinase 12	MMP12	E
Matrix metalloproteinase 13	MMP13	Ε
Matrix metalloproteinase 14	MMP14	Ε
Matrix metalloproteinase 15	MMP15	E
Matrix metalloproteinase 16	MMP16	Ē
Matrix metalloproteinase 17	MMP17	E
Matrix metalloproteinase 18	MMP18	=
Matrix metalloproteinase 19	MMP19	<u>_</u>
	MMP2	田田田田
Matrix metalloproteinase 2	MMP3, STMY1	E
Matrix metalloproteinase 3	-	E
Matrix metalloproteinase 4	MMP4	
Matrix metalloproteinase 5	MMP5	E
Matrix metalloproteinase 6	MMP6	E
Matrix metalloproteinase 7	MMP7	E
Matrix metalloproteinase 8	MMP8	E
Matrix metalloproteinase 9	MMP9	E
Methionine adenosyltransferase	MAT1A, MAT2A	Ε
Midline 1	MID1	G
Mitochondrial trifunctional protein, alpha	HADHA	Ε
subunit		
Mitochondrial trifunctional protein, beta	HADHB	Ε
subunit		
Monoamine oxidase A	MAOA	Ε
Monoamine oxidase B	MAOB	Ε
Muscarinic receptor, M1	CHRM1	Ν
Muscarinic receptor, M2	CHRM2	Ν
Muscarinic receptor, M3	CHRM3	Ν
Muscarinic receptor, M4	CHRM4	Ν
Muscarinic receptor, M5	CHRM5	N
Myoglobin		T
Myotubularin	MTM1	S
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3	G
NADH dehydrogenase		E
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS1	E
protein 1		. –
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS4	Ε
protein 4	NBSI 54	_
	NDUFV1	Е
NADH dehydrogenase (ubiquinone)	NDOI VI	L-
flavoprotein 1	DIA1	_
NADH-cytochrome b5 reductase	DIA1	E
NADPH-dependent cytochrome P450	POR	Ε
reductase	NED	_
Nebulin	NEB	S
Nephrosis 1	NPHS1	. T

Nerve growth factor	NGF	G
Nerve growth factor receptor	NGFR	G
Neuraminidase sialidase	NEU	Т
Neuregulin	HGL	G
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurokinin A	NKNA	N
Neurokinin B	NKNB	N
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	N
Nitric oxide synthase 1, NOS1	NOS1	E
Nitric oxide synthase 2, NOS2	NOS2	E
Nitric oxide synthase 3, NOS3	NOS3	E
Notch ligand - jagged 1	JAG1, AGS	G
Nucleoside diphosphate kinase-A	NDPKA	E
Oncogene ELK1	ELK1 ·	G
Oncogene ELK2	ELK2	G
Oncogene sis Ornithine delta-aminotransferase	PDGFB	G
Paired box homeotic gene 6	OAT	, E
Parathyroid hormone	PAX6	- G
Parathyroid hormone receptor	PTH DTUD4	G
Parathyroid hormone related-peptide	PTHR1	G
Parathyroid hormone-like hormone	PTHrP PTHLH	G
Patched (Drosophila) homolog, PTCH	PTCH	G G
Peroxisomal membrane protein 3	PXMP3	
Peroxisome biogenesis factor 1	PEX1	T
Peroxisome biogenesis factor 19	PEX19	Ť
Peroxisome biogenesis factor 6	PEX6	'
Peroxisome biogenesis factor 7	PEX7	÷
Peroxisome receptor 1	PXR1	Ť
Phenylalanine hydroxylase	PAH	Ë
Phenylalanine monooxygenase		Ē
Phenylethanolamine N-methyltransferase,	PNMT	Ē
PNMT		_
Phosphofructokinase, liver	PFKL	Е
Phosphofructokinase, muscle	PFKM	E
Phosphoglucomutase		Ē
Phosphoglucose isomerase	GPI	Ē
Phosphoglycerate kinase 1	PGK1	Ē
Phosphoglycerate mutase 2	PGAM2	Ē
Phospholipase A2, group 10	PLA2G10	· 1
Phospholipase A2, group 1B	PLA2G1B	i
Phospholipase A2, group 2A	PLA2G2A	i
Phospholipase A2, group 2B	PLA2G2B	·
Phospholipase A2, group 4A	PLA2G4A	j
Phospholipase A2, group 4C	PLA2G4C	Ì

Phospholipase A2, group 5 Phospholipase A2, group 6 Phospholipase C epsilon Pineolytic beta-receptors Plasminogen Plasminogen activator inhibitor 1 Plasminogen activator inhibitor 2 Plasminogen activator receptor, Urokinase Plasminogen activator, Tissue Plasminogen activator, Urokinase Plasminogen activator, Urokinase Platelet derived growth factor Platelet derived growth factor receptor Platelet-activating factor receptor Potassium inwardly-rectifying channel J1 Potassium voltage-gated channel E1 Prekallikrein Procollagen N-protease	PLA2G5 PLA2G6 PLG PAI1 PAI2 UPAR; PLAUR PLAT; TPA UPA; PLAU PDGF PDGFR PAFR KCNJ1 KCNE1	
Progesterone receptor (RU486 binding receptor)	PGR	G
receptor) Proliferin Proopiomelanocortin Properdin P factor, complement Prosaposin Prostacyclin synthase Prostaglandin 15-OH dehydrogenase Prostaglandin D - DP receptor Prostaglandin E1 receptor Prostaglandin E2 receptor Prostaglandin E3 receptor Prostaglandin F - FP receptor Prostaglandin F2 alpha receptor Prostaglandin I2 receptor Prostaglandin IP receptor Prostaglandin IP receptor Protein C Protein C inhibitor Protein phosphatase 2, regulatory subunit A, beta isoform	PLF POMC PFC, PFD PSAP HGPD; PGDH PROC PCI PPP2R1B	G N
Protein S Prothrombin precursor Pyruvate carboxylase Pyruvate decarboxylase Pyruvate kinase Quinoid dihydropteridine reductase Renin Replication factor C Retinoblastoma 1 RIGUI Salivary amylase, AMY1	PROS1 F2 PC PDHA PKLR QDPR REN RFC2 RB1 RIGUI	

Selectin E	SELE	N
Selectin L	SELL	N
Selectin P	SELP	N
Serine hydroxymethyltransferase	SHMT	E
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1,	SCNN1G	N
gamma	20	.,
Sodium channel, voltage gated, type IV,	SCN4A	Ν
alpha polypeptide		•
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		••
Solute carrier family 21, member 2	SLC21A2	Т
Solute carrier family 4 (anion exchanger),	SLC4A1	Ť
member 1		
Solute carrier family 4 (anion exchanger),	SLC4A2	Ţ
member 2		
Solute carrier family 4 (anion exchanger),	SLC4A3	Т
member 3		
Solute carrier family 6 (GAMMA-	SLC6A1	T
AMINOBUTYRIC ACID transporter), member		
1		
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3	•	
Solute carrier family 6 (neurotransmitter	SLC6A2	T
transporter, noradrenaline), member 2		
Somatostatin receptor, SSTR2	SSTR2	G
Sphingomyelinase	SMPD1	Ε
Substance P		Ν
Succinate dehydrogenase 2	SDH2	Е
Succinate thiokinase		Ε
Succinyl CoA synthase		Ε
Superoxide dismutase 1	SOD1	Ε
Superoxide dismutase 3	SOD3	Ε

Surfactant pulmonary-associated protein A1 Surfactant pulmonary-associated protein A2 Surfactant pulmonary-associated protein B Surfactant pulmonary-associated protein C Surfactant pulmonary-associated protein D Surfeit 1 Survival of motor neuron 1, telomeric Talin T-BOX 2 T-BOX 3 TEK, tyrosine kinase, endothelial Telomerase protein component Thiolase, perioxisomal	SFTPA1 SFTPA2 SFTPB SFTPC SFTPD SURF1 SMN1 TLN TBX2 TBX3 TEK	TTTTTGTGGGEEE
Thrombin receptor	F2R	1
Thrombomodulin	THBD	1
Thrombopoietin	THPO	G
Thrombospondin	THBS1	G
Thromboxane A synthase 1	TBXAS1	ļ
Thromboxane A2	TXA2	1
Thromboxane A2 receptor	TBXA2R	1
Thyroglobulin	TG	G
Thyroid hormone receptor, alpha	THRA	G
Thyroid hormone receptor, beta	THRB	G
Thyroid peroxidase	TPO	G
Thyroid receptor auxiliary protein	TRAP	G
Thyroid-stimulating hormone receptor	TSHR	G
Thyroid-stimulating hormone, alpha	TSHA	G
Thyroid-stimulating hormone, beta	TSHB	G
Thyrotropin releasing hormone receptor	TRHR	G
Topoisomerase I		E
Transacylase	~-	E
Transferrin	TF	G
Transferrin receptor	TFRC	G
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G E
Transketolase	TKT	E
Transketolase-like 1	TKTL1	
Triosephosphate isomerase	TPI1	E
Trypsin inhibitor		T
Uncoupling protein 1	UROS	E
Uroporphyrinogen III synthase	VIPR	N
Vasoactive intestinal polypeptide receptor	VIER	G
Vasoinhibitory peptide	VNRA	T
Vitronectin receptor, alpha	VNKA	G
Von Hippel-Lindau gene	WHSC1	G
Wolf-Hirschhorn syndrome candidate 1 gene	XDH	E
Xanthine dehydrogenase	AUI I	Ľ

- 316. A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 315.
- 317.A set according to claim 315 or 316 in which a minority of said probes for listed genes are absent.
- 318.A set according to claim 315 or 316 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 319.A set according to claim 315 or 316 in which a limited number of probes are replaced by probes for non-listed genes.
- 320.A set of probes for a core group of genes according to any of claims 315 to 319 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 321.A set according to any of claims 315 to 320 consisting of probes for members of a sub-group of the core group.
- 322.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 323.A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 324.A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 325.A set according to claim 322 or 323 in which said substrate is a semiconductor microchip.
- 326.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 327. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 328. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 329.A medical device including a set according to any of claims 315 to 327 for use in an array for detection of differential gene expression levels.
- 330. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 315) in a target group of genes by hybridising a nucleic acid-containing

- sample from said patient or individual to a set according to any of claims 315 and 317 to 327 and relating the probe hybridisation pattern to said variations.
- 331. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 316) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 316 to 327 and relating the probe interaction pattern to said variations.
- 332. Use of a set or device according to any of claims 315 to 327 for the prognosis and management of patients suffering from or at risk of dysfunction, damage or disease of the respiratory system or experiencing the clinical or social consequences following dysfunction, damage or disease of the respiratory system.
- 333.Use of a set or device according to any of claims 315 to 327 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 334.Use of a set or device according to any of claims 315 to 327 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 335. Use of a set or device according to any of claims 315 to 327 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 336. Use of a set or device according to any of claims 315 to 327 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 337. Use of a set or device according to any of claims 315 to 327 for the development of new strategies of therapeutic intervention and in clinical trials.
- 338. Use of a set or device according to any of claims 315 to 327 for construction of and generation of algorithms for patient and healthcare management.
- 339. Use of a set or device according to any of claims 315 to 327 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 340. Use of a set or device according to any of claims 315 to 327 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 341. Use of a set or device according to any of claims 315 to 327 for predicting optimum configuration/management of thereapeutic intervention.
- 342. A method according to claim 330 or 331 in which the identification of gene variants is indicative of a higher risk of developing the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system for the patient or individual.
- 343. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system, which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system:

- obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 315 to 321;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system.
- 344. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 343.
- 345. A method according to any of claims 330, 331, 343 and 344 wherein at least one step is computer-controlled.
- 346. An assay suitable for use in a method according to any of claims 330, 331, 343 and 344; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 315 to 321 in a biological sample.
- 347. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 315 or 317 to 321 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - readout indicating the probability of a patient or individual developing the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system.
- 348. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 316 to 321 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process
 - readout indicating the probability of a patient or individual developing the symptoms of, and/or the clinical or social consequences following, dysfunction, damage or disease of the respiratory system.
- 349. A set of probes according to claim 315, wherein the probes are selected from

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the group consisting of oligonucleotides and polynucleotides.

350.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to injury, inflammation, infection, immunity and/or repair; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

IMMUNITY GENE LIST	HUGO gene symbol	Protein function
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	E
Acetylcholinesterase	ACHE	E
Acidic amino acid transporter		Ť
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	S
Actin, alpha, smooth, aortic	ACTA2	S
Actin, beta	ACTB	S
Actin, gamma 2	ACTG2	S
ADAM (A disintegrin and metalloproteinase) 1	ADAM1	E
ADAM (A disintegrin and metalloproteinase) 10		E
ADAM (A disintegrin and metalloproteinase) 11		E
ADAM (A disintegrin and metalloproteinase) 12		E
ADAM (A disintegrin and metalloproteinase) 13		Ε
ADAM (A disintegrin and metalloproteinase) 14		Ε.
ADAM (A disintegrin and metalloproteinase) 15		* * Extension
ADAM (A disintegrin and metalloproteinase) 16	ADAM16	E
ADAM (A disintegrin and metalloproteinase) 17	ADAM17	Е
ADAM (A disintegrin and metalloproteinase) 18	ADAM18	Ε
ADAM (A disintegrin and metalloproteinase) 19	ADAM19	E
ADAM (A disintegrin and metalloproteinase) 2	ADAM2	E
	ADAM3A	E
3A		
ADAM (A disintegrin and metalloproteinase) 3B	ADAM3B	E
ADAM (A disintegrin and metalloproteinase) 4	ADAM4	E

Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3	ADAM5 ADAM6 ADAM7 ADAM8 ADAM9 ADD1 ADD2 ADA ADORA1 ADORA2A ADORA2B ADORA3 ADCY1 ADCY2 ADCY3 ADCY4 ADCY5 ADCY6 ADCY7 ADCY6 ADCY7 ADCY8 ADCY9 ADRA1 ADRA2 ADRA1 ADRA2 ADRB1 ADRB2 ADRB3 ACTHR	
Albumin, ALB Aldosterone receptor Alpha 1 acid glycoprotein Alpha 2 macroglobulin alpha1-antitrypsin alpha2-antiplasmin Alpha-fetoprotein alpha-glucosidase, neutral AB alpha-glucosidase, neutral C Aminopeptidase P Amylo-1,6-glucosidase Amyloid beta A4 precursor protein Amyloid beta A4 precursor-like protein Androgen binding protein Androgen receptor Angiopoietin 1 Angiopoietin 2 Angiotensin converting enzyme Angiotensin receptor 1	ALB MLR AAG; AGP A2M PI PLI AFP GANAB GANC XPNPEP2 AGL APP APLP ABP AR ANGPT1 ANGPT2 ACE, DCP1 AGTR2	TGTIEEGEEENNTGGGETT

AGT		Ε
ANX 1		Ī
ADHR		Т
AMH		G
AT3		
		s
APOE		E S T
APT1		i
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DLIVI		G
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RDNE		
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DUNITY		G
DADD1		_
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		G
		G
		G
DUTE		E
CDU1		E
וחטט		G
	ANX 1 ADHR AMH AT3 APOE	ANX 1 ADHR AMH AT3 APOE APT1 APT1LG1 AIF ASL AHR AS AGA ATD, ATDC ATM ABC7 AIRE BCL1 BCL10 BCL3 BCL4 BCL5 BCL6 BCL7 BCL8 BCL9 BAX BCL2A1 BWR1A B2M BLMH BLM BDNF BDNFR BARD1 BCR BRCA1 BRCA2 BRCD1 BRCD2 BCHE

Cadherin EP		G
Cadherin N	CDH2	G
Cadherin P	CDH3	G
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	ŀ
Calcineurin A2	CALNA2	1
Calcineurin A3	CALNA3	1
Calcineurin B		1
Calcitonin receptor /Calcitonin gene-related	CALCR	N
peptide receptor		
Calcitonin/Calcitonin gene-related peptide	CALCA	, N
alpha		
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	N
subunit		
Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	N
1C	0.400.4.5	
Calcium channel, voltage-dependent, Alpha- 1D	CACNA1D	. N
Calcium channel, voltage-dependent, Alpha- 1E (CACNL1A6)	CACNA1E	N
	040040	
Calcium channel, voltage-dependent, Alpha- 2/delta	CACNA2	N
Calcium channel, voltage-dependent, Beta 1	CAOND4	
Calcium channel, voltage-dependent, Beta 3	CACNB1	N
Calcium channel, voltage-dependent, Beta 3 Calcium channel, voltage-dependent, L type,	CACNB3	N
alpha 1S subunit	CACNA1S	N
Calcium channel, voltage-dependent,	CACNICO	
Neuronal, Gamma	CACNG2	N
Calcium channel, voltage-dependent, P/Q	CACNA1A	
type, alpha 1A subunit	CACNATA	N
Calcium channel, voltage-dependent, T-type		
Calmodulin 1	CALM1	N
Calmodulin 2	CALM1	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CALIVIS CAMK2A	G
Calnexin	CANX	G
Calpain	CAPN, CAPN3	G
Calretinin	CALB2	E
Canalicular multispecific organic anion	CMOAT	N
ransporter	CIVIOAT	Ť
Carbonic anhydrase 3	CA3	_
	CA3	E
	CA1	E
	CA1	E
	CES1	E
	0201	Ε

Cardiac-specific homeobox, CSX	CSX	
Cartilage-hair hypoplasia gene	CHH	G
Caspase 1	CASP1	N
Catalase	CAT	G
Cathepsin G	CTSG	
CD1		E
CD10	CD1	j
·	CD10	I
CD100	CD100	J
CD101	CD101	1
CD103	CD103	1
CD106	CD106	1
CD107	CD107	f
CD108	CD108	Į
CD109	CD109	1
CD110	CD110	1
CD111	CD111	1
CD112	CD112	1
CD113	CD113	1
CD114	CD114	ı
CD115	CD115	1
CD116	CD116	1
CD117	CD117	1
CD118	CD118	ĺ
CD119	CD119	j
CD12	CD12	i
CD120	CD120	Ī
CD121	CD121	i
CD122	CD122	i
CD123	CD123	i
CD124	CD124	i
CD125	CD125	i
CD126	CD126	i
CD127	CD127	i
CD128	CD128	i
CD129	CD129	·
CD13	CD13	i
CD130	CD130	i
CD131	CD131	Taraban and Israel
CD132	CD132	i
CD133	CD133	i
CD134	CD134	i
CD135	CD135	1
CD136	CD136	· :
CD137	CD137	1
CD138	CD138	1
CD139	CD139	j 1
CD14	CD139 CD14	1
CD140	CD14 CD140	1
	OD 170	ı

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CD141		CD141	•
CD142	•	CD141	
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CD154 CD155		CD154	i
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CD156 CD157		CD156	1
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CD160		CD159 CD160	
CD161	•	CD161	
CD162		CD162	1
CD163		CD163	1
CD164		CD164	1
CD165	•	CD165	i
CD166		CD166	ï
CD17		CD17	1
CD19 CD2		CD19	
CD20		CD2	1
CD22		CD20 CD22	!
CD23		CD23	1
CD24		CD24	I I
CD25		CD25	
CD26		CD26	1
CD27	·	CD27	1
CD28	•	CD28	i
CD3		CD3	
CD30		CD30	1
CD31		CD31	· 1
CD33 CD34		CD33	. 1
CD34 CD36		CD34	1
CD30 CD37		CD36	ı
CD38		CD37 CD38	1
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CD41	CD41 1
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CD60	CD60
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CD66	CD66
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CD83	CD83
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CD85	CD84
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CD86	CD86
CD88	CD88 !
CD89	CD89
CD9	CD9
CD90	CD90
CD91	CD91
CD92	CD92
0002	GD32

CD93 CD94 CD96 CD97 CD98 CD99 Cell adhesion molecule, intercellular, ICAM Cell adhesion molecule, leukocyte-endothelial, LECAM (CD62)	CD93 CD94 CD96 CD97 CD98 CD99 ICAM1 LECAM1	
Cell adhesion molecule, liver, LCAM Cell adhesion molecule, neural, NCAM1 Cell adhesion molecule, neural, NCAM120 Cell adhesion molecule, neural, NCAM2 Cell adhesion molecule, platelet-endothelial, PECAM	LCAM NCAM1 NCAM120 NCAM2 PECAM1	G G G G
Cell adhesion molecule, vascular, VCAM Chediak-Higashi syndrome 1 gene Chemokine MCAF Chemokine receptor CCR2 Chemokine receptor CCR3 Chemokine receptor CCR5 Chemokine receptor CXCR1 Chemokine receptor CXCR2 Chemokine receptor CXCR2 Chemokine receptor CXCR4 Cholesterylester hydrolase Chondritin Sulphate A - placental receptor	VCAM1 CHS1 MCAF CCR2 CCR3 CCR5 CXCR1 CXCR2 CXCR4	G T
Chromogranin A Chymase	CHGA CHY1	G
Clathrin CoA transferase		T F
Collagen I alpha 1 Collagen II alpha 1 Collagen III alpha 1 Collagen IV alpha 1 Collagen IV alpha 1 Collagen IV alpha 2 Collagen IV alpha 3 Collagen IV-alpha 4 Collagen IV alpha 5 Collagen IV alpha 6 Collagen IX alpha 2 Collagen IX alpha 3 Collagen IX alpha 3 Collagen IX alpha 3 Collagen V alpha 1 Collagen V alpha 1 Collagen VI alpha 1 Collagen VI alpha 2 Collagen VI alpha 2 Collagen VI alpha 2 Collagen VI alpha 3	COL1A1 COL1A2 COL2A1 COL3A1 COL4A1 COL4A2 COL4A3 COL4A4 COL4A5 COL4A6 COL9A2, EDM2 COL9A3 COLR COL5A1 COL5A1 COL5A2 COL6A1 COL6A2 COL6A3	E

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Collagen VII alpha 1	COL7A1	S
Collagen X alpha 1	COL10A1	S
Collagen X alpha 1	COL11A1	S
Collagen XI alpha 2	COL11A2	S
Collagen XVII alpha 1	COL17A1	S
Collagenic-like tail subunit of asymmetric	COLQ	E
acetylcholinesterase		_
Colony-stimulating factor 1	CSF1	G
Colony-stimulating factor 1 receptor	CSF1R	G
Colony-stimulating factor 2	CSF2	G
Colony-stimulating factor 2 alpha receptor	CSF2RA	G
Colony-stimulating factor 2 beta receptor	CSF2RB	G
Colony-stimulating factor 3	CSF3	G
Colony-stimulating factor 3 receptor	CSF3R	G
Complement component C1 inhibitor	C1NH	
Complement component C1qa	C1QA	!
Complement component C1qb	C1QB	!
Complement component C1qg	C1QG	ŀ
Complement component C1r	C1QG C1R	
Complement component C1s		
	C1S	!
Complement component C2	C2 .	!
Complement component C3	C3	!
Complement component C4A	C4A	1
Complement component C4B	C4B	!
Complement component C5	C5	ł
Complement component C6	C6	ı,
Complement component C7	C7	- 1
Complement component C8	C8B	l
Complement component C9	C9	
Complement component receptor 1	CR1	1
Complement component receptor 2	CR2	-
Complement component receptor 3	CR3	1
Contactin	CNTN1	G
Core-binding factor, alpha 1	CBFA1	G
Core-binding factor, alpha 2	CBFA2	G
Core-binding factor, beta	CBFB	G.
Cortico-steroid binding protein		Т
Corticosteroid nuclear receptor	•	6.2
Corticotrophin-releasing hormone	CRH	Т
Corticotrophin-releasing hormone receptor	CRHR1	Т
Cortisol receptor		1
C-reactive protein CRP		1
c-src tyrosine kinase	CSK	G
Cyclic AMP response element binding protein	CREB	G
Cyclic AMP-dependent protein kinase	PKA ·	Ē
Cyclic nucleotide phosphodiesterase 1B	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	Ē
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	Ē

Cyclic nucleotide phosphodiesterase 3A	PDE3A		_
Cyclic nucleotide phosphodiesterase 3B	PDE3B		E
Cyclic nucleotide phosphodiesterase 4A	PDE4A		E
Cyclic nucleotide phosphodiesterase 4C	PDE4C		E
Cyclic nucleotide phosphodiesterase 5A	PDE5A		E
Cyclic nucleotide phosphodiesterase 6A	PDE6A		E
Cyclic nucleotide phosphodiesterase 6B	PDE6B		E
Cyclic nucleotide phosphodiesterase 7	PDE7		E
Cyclic nucleotide phosphodiesterase 8	PDE8		Ε
Cyclic nucleotide phosphodiesterase 9A	PDE9A		E
Cyclin D	CCND1		E
Cyclin-dependent kinase 1	CDK1		G
Cyclin-dependent kinase 10	CDK10		G
Cyclin-dependent kinase 2	CDK10		G
Cyclin-dependent kinase 3	CDK3		G
Cyclin-dependent kinase 4	CDK4		G
Cyclin-dependent kinase 5	CDK5		G
Cyclin-dependent kinase 6	CDK6		G G
Cyclin-dependent kinase 7	CDK7		G
Cyclin-dependent kinase 8	CDK8		G
Cyclin-dependent kinase 9	CDK9	•	G
Cyclin-dependent kinase inhibitor 1A (P21,	CDKN1A		G
CIP1)			J
Cyclin-dependent kinase inhibitor 1B (P27,	CDKN1B		G
KIP1)			_
Cyclin-dependent kinase inhibitor 1C (P57,	CDKN1C		G
KIP2)			
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A		G
Cyclin-dependent kinase inhibitor 3	CDKN3		G
Cyclooxygenase 1 Cyclooxygenase 2	COX1		Ε
Cyclophilin	COX2		E
CYP11A1	0\/04444		- 1
CYP11B1	CYP11A1		E
CYP11B2	CYP11B1		E
CYP17	CYP11B2		E
CYP19	CYP17		E
CYP1A1	CYP19 CYP1A1		E
CYP1A2	CYP1A1	•	E
CYP1B1	CYP1B1		E
CYP21	CYP21		E
CYP24	CYP24		E
CYP27	CYP27		E
CYP27B1	PDDR		E
CYP2A1	CYP2A1		E
CYP2A13	CYP2A13		E
CYP2A3	CYP2A3		E
CYP2A6V2	CYP2A6V2	•	E
,	5		C

CYP2A7 CYP2B6 CYP2C18 CYP2C19 CYP2C8 CYP2C9 CYP2D6 CYP2E1 CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP5A1 CYP5A1 CYP7A CYP8 Cystathionase Cystathione beta synthase Cystic fibrosis transmembrane conductance	CYP2A7 CYP2B6 CYP2C18 CYP2C19 CYP2C8 CYP2C9 CYP2D6 CYP2E1 CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP5A1 CYP5A1 CYP7A CYP8 CTH CBS CFTR		
regulator, CFTR Cytidine deaminase Cytidine-5-prime-triphosphate synthetase Cytochrome a	CDA CTPS		E
Cytochrome c Cytochrome c oxidase, MTCO			E
Cytokine-suppressive antiinflammatory drug-	CSBP1		Ę
binding protein 1			ı
Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2		1
Defender against cell death 1	DAD1		G
Deleted in colorectal carcinoma	DCC		G
Deoxycorticosterone (DOC) receptor	•	1 - 12 - 1	E
Deoxycytidine kinase DCK			Ε
Dihydrolipoyl dehydrogenase 2	PDHA		E E E
Dihydrolipoyl transacetylase Dopamine receptors D1	PDHA		
Dopamine receptors D1 Dopamine receptors D2	DRD1 DRD2		N
Dopamine receptors D3	DRD3		N
Dopamine receptors D4	DRD4		N N
Dopamine receptors D5	DRD5		N
Duffy blood group	FY		T
Dynamin	DNM1		Ġ

	EB1	•	_
	Elastase 1	ELAS1	G
	Elastase 2	ELAS2	E
٠	Endoglin	ENG	E S
	Endo-P-D-glucuronidase	LING	
	Enolase	ENO4	1
	Erythroid kruppel-like factor	ENO1	E
		EKLF	G
	Erythropoietin	EPO	. [
	Erythropoietin receptor	EPOR	ı
	Estrogen receptor	ESR	G
	EWS RNA-binding protein	EWSR1	G
	Factor 1 (No. one)	F1 ·	ı
	Factor B, properdin		· 1
	Factor D		l
	Factor H	HF1	i
	Factor I (letter I)	IF	i
	Factor III	F3	ı
	Factor IX	F9	I
	Factor V	F5	1
	Factor VII	F7	- 1
	Factor VIII	F8	1
	Factor X	F10	1
	Factor XI	F11	1
	Factor XII	F12	1
	Factor XIII A & B	F13A & F13B	1
	Fanconi anemia, complementation group C	FANCC	T
	Fanconi anemia, complementation group D	FANCD	Т
	Fc fragment of IgG, low affinity IIa, receptor for	FCGR2A	G
	(CD32)		
	Fc receptor		ı
	Fibrinogen alpha	FGA	S
	Fibrinogen beta	FGB	S
	Fibrinogen gamma	FGG	S
	Fibronectin precursor	FN1	G
	Follicle stimulating hormone receptor	FSHR, ODG1	G
	Follicle stimulating hormone, FSH	FSHB	G
	Follicular lymphoma variant translocation 1	FVT1	1
	Forkhead rhabdomyosarcoma gene	FKHR	· G
	Forkhead transcription factor 7	FKHL7	G
	Galactosyltransferase 1	GT1	G
	Galactosyltransferase, alpha 1,3	GGTA1	G
	Galactosyltransferase, beta 3	B3GALT	G
	Glial-cell derived neurotrophic factor (GDNF)		Ν
	receptor		
	Glial-cell derived neurotrophic factor, GDNF	GDNF	Ν
	Glucosaminyl (N-acetyl) transferase 2, I-	GCNT2	E
	branching enzyme		
	Glutamate receptor 1	GLUR1	Ν

•		
Glutamate receptor 2	GLUR2	N
Glutamate receptor 3	GLUR3	N
Glutamate receptor 4	GLUR4	N
Glutamate receptor 5	GLUR5	N
Glutamate receptor 6	GLUR6	N
Glutamate receptor 7	GLUR7	N
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	N
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	N
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
Glutamine synthase		E
Glutathione	GSH	T
Glutathione peroxidase, GPX1	GPX1	Ė
Glutathione peroxidase, GPX2	GPX2	E
Glutathione S-transferase mu 1, GSTM1	GSTM1	E
Glutathione S-transferase mu 4, GSTM4		Ε
Glutathione S-transferase, GSTZ1	GSTZ1	E
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	Ε
GAPDH		
Glycerol kinase	GK	Ε
Glycinamide ribonucleotide (GAR)	GART	Ε
transformylase		
Glycophorin A	GYPA	S
Glycophorin B	GYPB	S
Glycophorin C	GYPC	S
Glycosyltransferases, ABO blood group	ABO	Ε
Glypican 3	GPC3, SDYS	G
Gonadotropin releasing hormone receptor	GNRHR	G
Growth-regulated protein precursor, GRO	GRO	1
Guanine nucleotide-binding protein, alpha	GNAI1	Ν
inhibiting activity polypeptide 1, GNAI1		
Guanine nucleotide-binding protein, alpha	GNAI2	Ν
inhibiting activity polypeptide 2, GNAI2		
Guanine nucleotide-binding protein, alpha	GNAI3	Ν
inhibiting activity polypeptide 3, GNAI3	•	
Guanine nucleotide-binding protein, alpha	GNAS1	Ν
stimulating activity polypeptide, GNAS1		
Guanine nucleotide-binding protein, alpha	GNAS2	Ν
stimulating activity polypeptide, GNAS2		
Guanine nucleotide-binding protein, alpha	GNAS3	Ν
stimulating activity polypeptide, GNAS3		
Guanine nucleotide-binding protein, alpha	GNAS4	Ν
stimulating activity polypeptide, GNAS4		
Guanine nucleotide-binding protein, q	GNAQ	Ν
polypeptide	4 TTD 4 D	
H(+), K(+) - ATPase	ATP4B	Ν
Haemoglobin alpha 1	HBA1	Τ

Haemoglobin alpha 2 Haemoglobin beta Haemoglobin delta Haemoglobin gamma A Haemoglobin gamma B Haemoglobin gamma G Haptoglobin, alpha 1 Haptoglobin, alpha 2 Haptoglobin, beta Hemochromatosis Heparin binding epidermal growth factor Heparin Cofactor II Hepatitis B virus integration site 1 Hepatitis B virus integration site 2 High mobility group protein C High mobility group protein Y Histamine receptors, H1 Histamine receptors, H2 Histamine receptors, H3 Histatin 1 Histatin 2	HBA2 HBB HBD HBG1 HBG2 HBGG HPA1 HPA2 HPB HFE HBEGF HCF2 HVBS1 HVBS6 HMGIC HMGIY		T T T T T T I I I I I I I I I I I I I I
Histatin 3	HTN3		i
HLA-B associated transcript 1	BAT1		1
Holocarboxylase synthetase	HLCS		Ε
Homeobox 11	HOX11		G
Homeobox HB24	HLX1		G
IC7 A and B			I
lkaros gene	IKAROS	•	G
Immunoglobulin alpha (IgA)	IGHA		ı
Immunoglobulin delta (IgD)	IGHD		!
Immunoglobulin E (IgE) reponsiveness gene	IGER		İ
Immunoglobulin E (IgE) serum concentration	IGES		. 1
regulator gene	10115		
Immunoglobulin epsilon (IgE)	IGHE		<u> </u>
Immunoglobulin gamma (IgG) 2 Immunoglobulin heavy mu chain	IGHG2		!
Immunoglobulin J polypeptide	IGHM		l
Immunoglobulin kappa constant region	IGJ		!
Immunoglobulin kappa constant region	IGKC	·	ļ
Insulin-like growth factor 1	IGKV IGF1		1
Insulin-like growth factor 1 receptor	IGF1R		G
Insulin-like growth factor 2	IGF1R		G
Insulin-like growth factor 2 receptor	IGF2R		G
Integrin beta 1	ITGB1		G
Integrin beta 2	ITGB1		G G
Integrin beta 3	ITGB3		G
Integrin beta 4	ITGB4		G
Integrin beta 5	ITGB5		G
-			

Integrin beta 6	ITGB6	G
Integrin beta 7	ITGB7	G
Integrin, alpha 1	ITGA1	Ğ
Integrin, alpha 2	ITGA2	Ğ
Integrin, alpha 4	ITGA4	G
Integrin, alpha 5	ITGA5	G
Integrin, alpha 6	ITGA6	G
Integrin, alpha M	ITGAM	G
Intercellular adhesion molecule 1	ICAM1	i
Intercellular adhesion molecule 2	ICAM2	i
Intercellular adhesion molecule 3	ICAM3	i
Interferon alpha	IFNA1	i
Interferon beta	IFNB	j
Interferon gamma	IFNG	i
Interferon gamma receptor 1	IFNGR1	,
Interferon gamma receptor 2	IFNGR2	, , , , , , , , , , , , , , , , , , ,
Interferon regulatory factor 1	IRF1	1
Interferon regulatory factor 4	IRF4	
Interleukin(IL) 1 receptor	IL1R	. 1
Interleukin(IL) 1, alpha	IL1A	
Interleukin(IL) 1, beta	IL1B	i
Interleukin(IL) 10	IL10	i
Interleukin(IL) 10 receptor	IL10R	i
Interleukin(IL) 11	IL11	i
Interleukin(IL) 11 receptor	IL11R	i
Interleukin(IL) 12	iL12	į
Interleukin(IL) 12 receptor, beta 1	IL12RB1	Ī
Interleukin(IL) 13	IL13	. 1
Interleukin(IL) 13 receptor	IL13R	1
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	1
Interleukin(IL) 2 receptor, gamma	IL2RG	1
Interleukin(IL) 3	IL3	1
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	1
Interleukin(IL) 4 receptor	-IL4R	ı
Interleukin(IL) 5	IL5	1
Interleukin(IL) 5 receptor	IL5R ···	a super and
Interleukin(IL) 6	IL6	
Interleukin(IL) 6 receptor	IL6R	1
Interleukin(IL) 7	IL7	1
Interleukin(IL) 7 receptor	IL7R	ļ
Interleukin(IL) 8	IL8	I
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9 -	1
Interleukin(IL) 9 receptor	IL9R	1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	İ
Janus kinase 1	JAK1	G

Janus kinase 2	JAK2	G
Janus kinase 3	JAK3	G
Kallikrein 3	KAK3	1
Kell blood group precursor	XK, KEL	Ť
Kininogen, High molecular weight	KNG	İ
Kynureninease		Ė
Lactotransferrin	LTF	T
Laminin 5, alpha 3	LAMA3	Ġ
Laminin 5, beta 3	LAMB3	G
Laminin 5, gamma 2	LAMC2	G
Laminin M	LAMM	G
Laminin receptor 1	LAMR1	G
Latent transforming growth factor-beta binding		G
protein 2	21512	G
Lectin, mannose-binding 1	LMAN1	
Lectin, mannose-binding 2	MBL2	!
Leptin	LEP	
Leptin receptor	LEPR	G
Leukaemia inhibitory factor	LIF	G
Leukaemia inhibitory factor receptor	LIFR	G G
Leukin	LII IX	G
Leukocyte-specific transcript 1	LST-1	1
Leukotriene A4 hydrolase	201-1	1
Leukotriene A4 synthase	LTA4S	_
Leukotriene B4 receptor	LIATO	Ë
Leukotriene B4 synthase	LTB4S	<u> </u>
Leukotriene C4 receptor	21040	E
Leukotriene C4 synthase	LTC4S	E
Leukotriene D4/E4 receptor	21040	
LIM homeobox protein 1	LHX1	G
LIM homeobox protein 2	LHX2	G
LIM homeobox protein 3	LHX3	G
LIM homeobox protein 4	LHX4	
LIM-domain only protein 1	LMO1	G G
LIM-domain only protein 2	LMO2	_
LIM-domain only protein 3	LMO3	G
LIM-domain only protein 4	LMO4	G
LIM-Kinase I (LINK-I)		G
Lipocortin 1	ANX4	1
Lipoprotein-associated coagulation factor	LACI	1
Lipoxygenase 12 (platelets)	LOG12	1
Lipoxygenase 5 (leukocytes)	10012	!
Lymphoblastic leukemia derived sequence 1	LYL1	1
Lymphocyte-specific protein tyrosine kinase	LCK	!
Lymphoid enhancer-binding factor	LEF-1	_
lymphotoxin	LL: -1	G
Lysozyme	LYZ	1
Macrophage activating factor	MAF	l I
1 3	1717 11 -	ı

Macrophage inflammatory protein-1	MIP1	!
Macrophage inflammatory protein-1 receptor Macrophage inflammatory protein-2	MIP2	1
Macrophage inflammatory protein-2 receptor MAD (mothers against decapentaplegic,	MADH3	l G
Drosophila) homologue 3	141/10110	G
MAD (mothers against decapentaplegic,	MADH4	G
Drosophila) homologue 4		
Malignant proliferation, eosinophil gene	MPE	1
Mannose binding protein	MBP	1
Mannosidase, alpha B lysosomal Marenostrin	MANB	E
Matrix metalloproteinase 1	MEFV MMP1	Ţ
Matrix metalloproteinase 10	MMP10	E
Matrix metalloproteinase 11	MMP11	E
Matrix metalloproteinase 12	MMP12	E
Matrix metalloproteinase 13	MMP13	E
Matrix metalloproteinase 14	MMP14	E
Matrix metalloproteinase 15	MMP15	E
Matrix metalloproteinase 16	MMP16	. E
Matrix metalloproteinase 17	MMP17	Ē
Matrix metalloproteinase 18	MMP18	E
Matrix metalloproteinase 19	MMP19	Ε
Matrix metalloproteinase 2	MMP2	E
Matrix metalloproteinase 3	MMP3, STMY1	E
Matrix metalloproteinase 4	MMP4	Ε
Matrix metalloproteinase 5	MMP5	· E
Matrix metalloproteinase 6	MMP6	E
Matrix metalloproteinase 7	MMP7	Ε
Matrix metalloproteinase 8	MMP8	Ε
Matrix metalloproteinase 9	MMP9	Ε
MHC Class I: A		1
MHC Class I: B		I
MHC Class I: C MHC Class I: LMP-2, LMP-7		l l
MHC Class I: Tap1	ADOD TADA	!
MHC Class II: DP	ABCR, TAP1	1
MHC Class II: DQ	HLA-DPB1	<u> </u>
MHC Class II: DR		
MHC Class II: Tap2	TAP2, PSF2	1
MHC Class II:Complementation group A	MHC2TA	; !
MHC Class II:Complementation group B	rfxank	!
MHC Class II:Complementation group C	RFX5	ı I
MHC Class II:Complementation group D	RFXAP	I 1
Monocyte chemoattractant protein 1	MCP1	! 1
Mucin 18	MUC18	1 T
Mutated in colorectal cancers, MCC	MCC	l G
MutL homolog 1	MLH1	G
•		G

MutS homolog 2 MutS homolog 3 Myeloid leukemia factor-1 Myeloperoxidase Myoglobin Myosin 5A	MSH2 MSH3 MLF1 MPO	·	G G I I
N-acyl hydrolase NADPH oxidase	MYO5A	•	S
NADPH-dependent cytochrome P450 reductase	POR		E
Natural resistance-associated macrophage protein 1 NB6	NRAMP1		1
	NOT		- 1
Nerve growth factor	NGF		G
Nerve growth factor receptor Neurofibromin 1	NGFR		G
Neurofibromin 2	NF1		G
Neurokinin A	NF2		G
Neurokinin B	NKNĄ		N
Neuropeptide Y	NKNB NPY		N
Neuropeptide Y receptor Y1	NPY NPY1R		N
Neuropeptide Y receptor Y2	NPY2R		N
Neutral endopeptidase	NET ZE		N
Neutrophil cystolic factor 1	NCF1		E
Neutrophil cystolic factor 2	NCF1 NCF2		i
Nitric oxide synthase 1, NOS1	NOS1		
Nitric oxide synthase 2, NOS2	NOS1 NOS2		E
Nitric oxide synthase 3, NOS3	NOS2	•	E
Norrie disease protein	NDP		Ε
Notch 3	NOTCH3	,	G
Notch ligand - jagged 1	JAG1, AGS		G
Nuclear factor I-kappa-B-like gene	IKBL		G
Nuclear factor kappa beta	NFKB		1
Nuclear factor of activated T cells (NFAT)	NFATC		_
complex, cytosolic	MAIO		G
Nuclear factor of activated T cells (NFAT) complex, preexisting component	NFATP		G
Nucleoside diphosphate kinase-A Oncogene bcl2	NDPKA	* ***	E ·
Oncogene ELK1	ELK1		G
Oncogene ELK2	ELK2		G
Oncogene ERG (early reponse gene)	,		Ğ
Oncogene GLI1	GLI		Ğ
Oncogene GLI2	GLI2		G
Oncogene GLI3	GLI3		G
Oncogene spi1	= =		G
Oncogene TEL	ETV6		G
Oncostatin M	OSM		G
			9

Oncostatin M receptor	OSMR	G
Omithine delta-aminotransferase	OAT	Ē
Osteonectin	ON	Ğ
Osteopontin	OPN	Ğ
Paired box homeotic gene 3	PAX3	G
Paired box homeotic gene 7	PAX7	Ğ
Patched (Drosophila) homolog, PTCH	PTCH	Ğ
Peanut-like 1	PNUTL1	Ī
Phagocytin		i
Phenylethanolamine N-methyltransferase,	PNMT	Ė
PNMT		_
Phosphatidylinositol glycan, class A	PIGA	G
(paroxysmal nocturnal hemoglobinuria)		•
Phospholipase A2, group 10	PLA2G10	1
Phospholipase A2, group 1B	PLA2G1B	i
Phospholipase A2, group 2A	PLA2G2A	i
Phospholipase A2, group 2B	PLA2G2B	i
Phospholipase A2, group 4A	PLA2G4A	i
Phospholipase A2, group 4C	PLA2G4C	i
Phospholipase A2, group 5	PLA2G5	i
Phospholipase A2, group 6	PLA2G6	i
Phospholipase C alpha		i
Phospholipase C beta		i
Phospholipase C delta	PLCD1	i
Phospholipase C epsilon		Ĺ
Phospholipase C gamma	PLCG1	i
Phosphomannomutase-2	PMM2	Ť
Plakophilin 1	PKP1	Т
Plasminogen	PLG	E
Plasminogen activator inhibitor 1	PAI1	E
Plasminogen activator inhibitor 2	PAI2 .	Ε
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	E
Plasminogen activator, Urokinase	UPA; PLAU	E
Platelet glycoprotein 1b, alpha	GP1BA	ı
Platelet glycoprotein 1b, beta	GP1BB	ı
Platelet glycoprotein 1b, gamma	GP1BG	1
Platelet glycoprotein IX	GP9	1
Platelet glycoprotein V	GP5	ı
Platelet-activating factor acetylhydrolase 1B	PAFAH1B1 or LIS1	ĺ
Platelet-activating factor acetylhydrolase 2	PAFAH2	1
Platelet-activating factor receptor	PAFR	1
Poliovirus receptor	PVR, PVS	İ
Potassium channel, calcium-activated,	KCNN4	N
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1	N
Potassium voltage-gated channel E1	KCNE1	N
		• •

Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	N
Prekallikrein		1
Preproenkephalin	PENK	N
Procollagen N-protease		E
Promyelocytic leukemia gene	PML	G
Proopiomelanocortin	POMC	N
Properdin P factor, complement	PFC, PFD	ì
Prostacyclin synthase	,	i
Prostaglandin (PG) D synthase, hematopoietic	PGDS	Ė
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	1
Prostaglandin D - DP receptor		'
Prostaglandin E1 receptor		
Prostaglandin E2 receptor		i
Prostaglandin E3 receptor		;
Prostaglandin F - FP receptor	·	1
Prostaglandin I2 receptor		-
Prostaglandin IP receptor		T
Prostaglandin isomerase		1
Prostaglandin-endoperoxidase synthase 2	PTGS2	G
Protease inhibitor 1	1 1002	G
Protein C	PROC	Ţ
Protein C inhibitor	PCI	!
Protein kinase A	1 01	i
Protein kinase C, alpha	PRKCA	E
Protein kinase C, gamma	PRKCG	E
Protein kinase DNA-activated		E
Protein kinase G	PRKDC	E
	DDD4D2	Ε
subunit 3	PPP1R3	Ε
Durate? I I I O I I I I I I	DDD2D4D	_
beta isoform	PPP2R1B	Ε
	DD004	
	PROS1	I
Protein tyrosine phosphatase, non-receptor type 12	PTPN12	G
Proteinase 3		
	50	ı
	F2	ı
	NP	E
=	PDHA	Ε
5 4. 11. 0	RB1	G
	RBP4	T
	RHCE	Т
	RHD	Т
	RHAG	T
	RPS19	Ε
	RIGUI	G
S100 calcium-binding protein A1	S100A1	Ν
	•	

S100 calcium-binding protein A2	S100A2			N
S100 calcium-binding protein A3	S100A3			N
S100 calcium-binding protein A4	S100A4			N
S100 calcium-binding protein A5	S100A5			Ν
S100 calcium-binding protein A6	S100A6			N
S100 calcium-binding protein A7	S100A7			Ν
S100 calcium-binding protein A8	S100A8			Ν
S100 calcium-binding protein A9	S100A9			Ν
S100 calcium-binding protein B	S100B			Ν
S100 calcium-binding protein P	S100P			Ν
SAP (SLAM-associated protein)	SH2D1A			1
Selectin E	SELE			Ν
Selectin L	SELL			Ν
Selectin P	SELP		*	N
Serotonin receptor, 5HT1A	HTR1A			Ν
Serotonin receptor, 5HT1B	HTR1B			Ν
Serotonin receptor, 5HT1C	HTR1C			Ν
Serotonin receptor, 5HT1D	HTR1D			Ν
Serotonin receptor, 5HT1E	HTR1E			Ν
Serotonin receptor, 5HT1F	HTR1F			Ν
Serotonin receptor, 5HT2A	HTR2A		,	Ν
Serotonin receptor, 5HT2B	HTR2B			Ν
Serotonin receptor, 5HT2C	HTR2C			Ν
Serotonin receptor, 5HT3	HTR3			Ν
Serotonin receptor, 5HT4	HTR4			Ν
Serotonin receptor, 5HT5	HTR5			N
Serotonin receptor, 5HT6	HTR6		•	Ν
Serotonin receptor, 5HT7	HTR7			N
Severe combined immunodeficiency, type A	SCIDA			1
(Athabascan)				
Signal transducer and activator of transcription	STAT1			G
Signal transducer and activator of transcription	STAT2			G
2				
Signal transducer and activator of transcription 3	STAT3			G
Signal transducer and activator of transcription	CTAT4			_
4				G
Signal transducer and activator of transcription		10.7		·
5	SIMIS			G
Signaling lymphocyte activation molecule	SLAM			ı
Sine oculis homeobox, drosophila, homolog 1	SIX1		•	G
Sine oculis homeobox, drosophila, homolog 2	SIX2			G
Sjoegren (Sjogren) syndrome antigen A1	SSA1			1
Sodium channel, non-voltage gated 1, alpha	SCNN1A			Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B			N
Sodium channel, non-voltage gated 1, gamma	SCNN1G			N
Sodium channel, voltage gated, type V, alpha	SCN5A			Ν

•		
polypeptide		
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	N
Solute carrier family 19 (folate transporter),	SLC19A1	-
member 1	SECISAI	Т
Solute carrier family 20, member 1	SLC20A1	Т
Solute carrier family 20, member 2	SLC20A2	T
Solute carrier family 5 (sodium/glucose	SLC5A1	T
transporter), member 1	OLOGAT	1
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2	0200,12	'
Solute carrier family 5 (sodium/glucose	SLC5A5	т
transporter), member 5	,	•
Solute carrier family 5, member 3	SLC5A3	Т
Sorcin	SRI	Ť
Sperm protamine P1	PRM1	Ġ
Sperm protamine P2	PRM2	G
Stem cell factor	SCF	Ğ
Stromal derived factor 1	SDF1	Ğ
Succinate dehydrogenase 1	SDH1	, E
Succinate thiokinase		E
Superoxide dismutase 1	SOD1	E
Superoxide dismutase 3	SOD3	E E
SYK-related tyrosine kinase	SRK	· 1
Talin	TLN	G
Talin, TLN	•	S
T-cell acute lymphocytic leukemia 1	TAL1	1
T-cell acute lymphocytic leukemia 2	TAL2	ı
T-cell receptor, alpha	TCRA	1
T-cell receptor, delta	TCRD	•
Tenascin (cytotactin)		S
Tenascin XA	TNXA	S
Terminal deoxynucleotidyltransferase	TDT	<u>1</u>
Terminal deoxynucleotidyltransferase, TDT	50 D	E
Thrombin receptor Thrombopoietin	F2R	1
Thrombospondin	THPO	G
Thromboxane A synthase 1	THBS1	G
Thromboxane A2	TBXAS1	
Thromboxane A2 receptor	TXA2	l i
Thy-1 T-cell antigen	TBXA2R THY1	1
Thymic humoral factor	1111	1
Thymopoietin	ТМРО	1
Thymosin	TIMPO	G
TIE receptor tyrosine kinase	TIE-1	1
Tip-associated protein	TAP	G
Toll-like receptor 4	TLR4	1
Topoisomerase I		E
• ***********		

Topoisomerase II Transcobalamin 2, TCN2 Transcription factor 3 Transcription factor binding to IGHM enhancer 3	TCN2 TCF3 TFE3	E T G
Transferrin Transferrin receptor Transforming growth factor, alpha Transforming growth factor, beta 2 Transforming growth factor, beta induced Transforming growth factor, beta receptor 2 Tuberous sclerosis 1	TF TFRC TGFA TGFB2 TGFBI TGFBR2 TSC1	0000000
Tuberous sclerosis 2 Tubulin Tumor susceptibility gene 101 Tumour necrosis factor (TNF) receptor associated factor 1	TSC2 TSG101 TRAF1	G S G I
Tumour necrosis factor (TNF) receptor associated factor 2 Tumour necrosis factor (TNF) receptor	TRAF2.	1
associated factor 3 Tumour necrosis factor (TNF) receptor	TRAF4	1
associated factor 4 Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	1.
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	1
Tumour necrosis factor alpha Tumour necrosis factor alpha receptor Tumour necrosis factor beta Tumour necrosis factor beta receptor	TNFA TNFAR TNFB TNFBR	
Tumour protein p53 Tumour protein p63 Tumour protein p73	TP53, P53 TP63 TP73	- G G
Tumour protein, translationally-controlled 1 Tumour suppresssor gene DRA Ubiquitin	TPT1 DRA	G I G
Ubiquitin activating enzyme, E1 Ubiquitin B Ubiquitin C	UBB UBC	E G
Ubiquitin fusion degeneration 1-like Ubiquitin protein ligase E3A Undulin 1	UFD1L UBE3A COL14A1	G E S
Uridine monophosphate kinase Uridine monophosphate synthetase Uroporphyrinogen III synthase Vimentin	UMPK UMPS UROS VIM	 l E
v-myc avian myelocytomatosis viral oncogene	MYC	G

homolog	• *	
Von Hippel-Lindau gene	VHL	G
Werner syndrome helicase	WRN	G
Wilms tumour gene 1	WT1	G
Wilms tumour gene 2	WT2	G
Wilms tumour gene 4	WT4	G
Winged helix nude	WHN	G
Wiskott-Aldrich syndrome protein	WASP, THC	1
Xanthine dehydrogenase	XDH	Ε
X-ray repair gene	XRCC9	G
Zinc finger protein 198	ZIC198	S
Zinc finger protein HRX	ALL1	ı

- 351.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 350.
- 352.A set according to claim 350 or 351 in which a minority of said probes for listed genes are absent.
- 353.A set according to claim 350 or 351 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 354.A set according to claim 350 or 351 in which a limited number of probes are replaced by probes for non-listed genes.
- 355.A set of probes for a core group of genes according to any of claims 350 to 354 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 356.A set according to any of claims 350 to 355 consisting of probes for members of a sub-group of the core group.
- 357.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 358.A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 359.A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 360.A set according to claim 357 or 358 in which said substrate is a semiconductor microchip.
- 361.A set according to any preceding claim for use in a biological assay for detection of said gene variants.

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- 362. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 363. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 364.A medical device including a set according to any of claims 350 to 362 for use in an array for detection of differential gene expression levels.
- 365. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 350) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 350 and 352 to 362 and relating the probe hybridisation pattern to said variations.
- 366. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 351) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 351 to 362 and relating the probe interaction pattern to said variations.
- 367. Use of a set or device according to any of claims 350 to 362 for the prognosis and management of patients suffering from or at risk of experiencing the symptoms and consequences of injury, inflammation, infection, immunity and/or repair.
- 368.Use of a set or device according to any of claims 350 to 362 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 369. Use of a set or device according to any of claims 350 to 362 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 370. Use of a set or device according to any of claims 350 to 362 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 371. Use of a set or device according to any of claims 350 to 362 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 372. Use of a set or device according to any of claims 350 to 362 for the development of new strategies of therapeutic intervention and in clinical trials.
- 373. Use of a set or device according to any of claims 350 to 362 for construction of and generation of algorithms for patient and healthcare management.
- 374. Use of a set or device according to any of claims 350 to 362 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 375. Use of a set or device according to any of claims 350 to 362 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 376.Use of a set or device according to any of claims 350 to 362 for predicting optimum configuration/management of thereapeutic intervention.
- 377.A method according to claim 365 or 366 in which the identification of gene variants is indicative of a higher risk of experiencing the symptoms and

- consequences of injury, inflammation, infection, immunity and/or repair for the patient or individual.
- 378. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop the symptoms and consequences of injury, inflammation, infection, immunity and/or repair which method comprises:
- i) obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from the symptoms and consequences of injury, inflammation, infection, immunity and/or repair;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the symptoms and consequences of injury, inflammation, infection, immunity and/or repair;
- analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 350 to 356;
 - iv) calculating the frequencies of these alleles in the samples from i) and ii);
 - v) comparing the frequencies of these alleles in i) and ii);
 - vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of experiencing the symptoms and consequences of injury, inflammation, infection, immunity and/or repair.
 - 379. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 278.
 - 380. A method according to any of claims 365, 366, 378 and 379 wherein at least one step is computer-controlled.
 - 381. An assay suitable for use in a method according to any of claims 365, 366, 378 and 379; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 350 to 356 in a biological sample.
 - 382. A formatted assay technique (kit) for use in assessing the risk of a patient or individual experiencing the symptoms and consequences of injury, inflammation, infection, immunity and/or repair; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 350 or 352 to 356 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual experiencing the symptoms and consequences of injury, inflammation, infection, immunity and/or repair.
 - 383. A formatted assay technique (kit) for use in assessing the risk of a patient or individual experiencing the symptoms and consequences of injury, inflammation, infection, immunity and/or repair; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 351 to 356 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process

- readout indicating the probability of a patient or individual experiencing the symptoms and consequences of injury, inflammation, infection, immunity and/or repair.
- 384. A set of probes according to claim 350, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 385.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to dysfunction, damage or disease consequent on an aberration in the processes of development; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

DEVELOPMENT GENE LIST	HUGO gene symbol	Protein function
17-ketosteroid reductase		N
2,4-dienoyl CoA reductase	DECR	Ε
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	. ¹ E
3-oxoacid CoA transferase	OXCT	Ε
6-pyruvoyltetrahydropterin synthase	PTS	E
Absent in melanoma 1 gene	AIM1	G
Acetoacetyl 2-CoA-thiolase	ACAT2	E
Acetyl CoA acyltransferase	ACAA	E
Acetyl CoA carboxylase alpha	ACACA	E
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	N
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N

Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	
Achromatopsia 2	ACHM2	E S
Acid phosphatase 2, lysosomal	ACP2	E
Acrosin	ACR	G
Actin, alpha, cardiac	ACTC	S
Actin, alpha, skeletal	ACTA1	s
Actin, alpha, smooth, aortic	ACTA2	S
Activin		Ğ
Activin A receptor, type 2B	ACVR2B	Ğ
Activin A receptor, type 2-like kinase 1	ACVRL1	G
Acyl CoA dehydrogenase, short chain	ACADS	Ε
Acyl-CoA thioesterase		E
ADAM (A disintegrin and metalloproteinase) 1	ADAM1	E
ADAM (A disintegrin and metalloproteinase) 10	ADAM10	Ε
ADAM (A disintegrin and metalloproteinase) 11	I ADAM11	Ε
ADAM (A disintegrin and metalloproteinase) 12	2 ADAM12	Ε
ADAM (A disintegrin and metalloproteinase) 13		E
ADAM (A disintegrin and metalloproteinase) 14		Ε
ADAM (A disintegrin and metalloproteinase) 15		Ε
ADAM (A disintegrin and metalloproteinase) 16		Ε
ADAM (A disintegrin and metalloproteinase) 17	' ADAM17	Ε
ADAM (A disintegrin and metalloproteinase) 18		Ε
ADAM (A disintegrin and metalloproteinase) 19	ADAM19	Ε
ADAM (A disintegrin and metalloproteinase) 2	ADAM2	Ε
ADAM (A disintegrin and metalloproteinase)	ADAM3A	E
3A		
ADAM (A disintegrin and metalloproteinase)	ADAM3B	Ε
3B		
ADAM (A disintegrin and metalloproteinase) 4	ADAM4	Ε
ADAM (A disintegrin and metalloproteinase) 5	ADAM5	Ε
ADAM (A disintegrin and metalloproteinase) 6	ADAM6	Ε
ADAM (A disintegrin and metalloproteinase) 7	ADAM7	E
ADAM (A disintegrin and metalloproteinase) 8	ADAM8	Ε
ADAM (A disintegrin and metalloproteinase) 9	ADAM9	E
Adducin, alpha	ADD1	S
Adducin, beta	ADD2	·S
• • •	APC	G
gene		
Adenosine deaminase	ADA	Ε
Adenosine monophosphate deaminase	AMPD	Ε
Adenosine receptor A1	ADORA1	Ν
Adenosine receptor A2A	ADORA2A	Ν
Adenosine receptor A2B	ADORA2B	Ν
Adenosine receptor A3	ADORA3	Ν
Adenyl cyclase		Ν
Adenylate cyclase 1	ADCY1	Ε

Adenylate cyclase 2 Adenylate cyclase 3 Adenylate cyclase 4 Adenylate cyclase 5 Adenylate cyclase 6 Adenylate cyclase 7 Adenylate cyclase 8 Adenylate cyclase 9 Adenylate cyclase 9 Adenylosuccinate lyase ADP-ribosyltransferase Adrenergic receptor, alpha1 Adrenergic receptor, alpha2 Adrenergic receptor, beta1 Adrenergic receptor, beta2 Adrenergic receptor, beta3 Adrenocorticotrophic hormone (ACTH)	ADCY2 ADCY3 ADCY4 ADCY5 ADCY6 ADCY7 ADCY8 ADCY9 ADSL ADPRT ADRA1 ADRA2 ADRB1 ADRB2 ADRB3 ACTHR	
receptor Adrenoleukodystrophy gene Alanine-glyoxylate aminotransferase Albumin, ALB Aldehyde dehydrogenase 1 Aldehyde dehydrogenase 2 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 5 Aldehyde dehydrogenase 6 Aldehyde dehydrogenase 7 Aldolase A Aldolase B Aldolase C Aldosterone receptor Alkaline phosphatase, liver/bone/kidney Alkaptonuria gene Alkylglycerone phosphate synthase Alpha 2 macroglobulin alpha tectorin alpha thalassemia gene alpha1-antitrypsin alpha2-antiplasmin alpha-actinin 2 alpha-actinin 3 alpha-amylase Alpha-fetoprotein alpha-Galactosidase A alpha-ketoglutarate dehydrogenase alpha-L-Iduronidase alpha-synuclein Amelogenin	ALD AGXT ALB ALDH1 ALDH10 ALDH2 ALDH5 ALDH6 ALDH7 ALDOA ALDOB ALDOC MLR ALPL AKU AGPS A2M TECTA ATRX PI PLI ACTN2 ACTN3 AFP GLA IDUA SNCA AMELX	

Aminopeptidase P	XPNPEP2		E
Amphiregulin	AREG		G
Amylo-1,6-glucosidase	AGL		E
Amyloid beta (A4) precursor protein-binding,	APBB1		N
APBB1			- '
Amyloid beta A4 precursor protein	APP		Ν
Amyloid beta A4 precursor-like protein	APLP		N
Androgen binding protein	ABP		Т
Androgen receptor	AR		Ġ
Angiopoietin 1	ANGPT1		G
Angiopoietin 2	ANGPT2		G
Angiotensin converting enzyme	ACE, DCP1		E
Angiotensinogen	AGT		E
Ankyrin 1	ANK1		S
Ankyrin 2	ANK2		S S S
Ankyrin 3	ANK3		S
Antidiuretic hormone receptor	ADHR		T
Anti-Mullerian hormone	AMH		Ġ
Anti-Mullerian hormone type 2 receptor	AMHR2		G
Antithrombin III	AT3	•	E
AP-2, alpha	TFAP2A		G
AP-2, beta	TFAP2B		G
AP-2, gamma	TFAP2C		G
Apaf-1			S
Apical protein, xenopus laevis-like	APXL		G
Apolipoprotein A 4	APOA4		T
Apolipoprotein A I	APOA1		Ť
Apolipoprotein A II	APOA2		Ť
Apolipoprotein B	APOB		÷
Apolipoprotein C1	APOC1		Ť
Apolipoprotein C2	APOC2		Ť
Apolipoprotein C3	APOC3		Ť
Apolipoprotein D	APOD		Ť
Apolipoprotein E	APOE		Ť
Apolipoprotein H	APOH		_
Apopain	CPP32		T
Apoptosis antigen 1	APT1		G
Apoptosis antigen ligand 1	APT1LG1		1.
Apoptosis-inducing factor	AIF] "
Apurinic endonuclease	APE		_
Archaete-scute homolog 1	ASH1		E
Archaete-scute homolog 2	ASH2		G
Arginosuccinate synthetase	ASS		G
Arrestin	SAG		E
Aryl hydrocarbon receptor	AHR		S
	ARNT		T
Arylsulfatase A	ARSA		T
Arylsulfatase B	ARSB		E
· ·· y ·· ·· ·· ·· ·· ·· ·· ·· ·· ·· ··	UIJOB		E

Arylsulfatase C	ARSC1	Ε
Arylsulfatase D	ARSD	E
Aryisulfatase E	ARSE	E
Arylsulfatase F	ARSF	Ε
Aspartate transaminase		Ŧ
Aspartate transcarbamoylase		Ē
Aspartoacylase	ASPA	Ē
Aspartylglucosaminidase	AGA	Ē
Astrotactin	ASTN	G
Ataxia telangiectasia complementation group [Ğ
Ataxia telangiectasia gene, AT	ATM	G
Ataxin 1	SCA1	
Ataxin 2	SCA2	G G
Ataxin 3	MJD	G
ATP-binding cassette transporter 7	ABC7	Ī
Atrial natriuretic peptide	ANP	Ġ
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
Atrophin 1	DRPLA	G
Attractin		J
Autoimmune regulator, AIRE	AIRE	İ
Azoospermia factor 1	AZF1	Ġ
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	G
B-cell CLL/lymphoma 1	BCL1	1
B-cell CLL/lymphoma 10	BCL10	i
B-cell CLL/lymphoma 3	BCL3	i
B-cell CLL/lymphoma 4	BCL4	i
B-cell CLL/lymphoma 5	BCL5	i
B-cell CLL/lymphoma 6	BCL6	i
B-cell CLL/lymphoma 7	BCL7	i
B-cell CLL/lymphoma 8	BCL8	i
B-cell CLL/lymphoma 9	BCL9	i
BCL2-associated X protein	BAX	Ġ
BCL2-related protein A1	BCL2A1	Ğ
Beckwith-Wiedemann region 1A	BWR1A	Ğ
Bestrophin	VMD2	T
beta 2 microglobulin	B2M	i
beta-endorphin receptor		N
beta-Glucuronidase	GUSB	E
beta-N-acetylhexosaminidase, A	3335	
beta-N-acetylhexosaminidase, B	• •	E
Bilirubin UDP-glucuronosyltransferase		Ē
Bleomycin hydrolase	BLMH	E
Bloom syndrome protein	BLM	G
Blue cone pigment	BCP	S
Bone morphogenetic protein, BMP1	BMP1	G
Bone morphogenetic protein, BMP2	BMP2	G
= 1.1		9

		•	
	Bone morphogenetic protein, BMP3	BMP3	_
	Bone morphogenetic protein, BMP4	BMP4	G
	Bone morphogenetic protein, BMP5	BMP5	G
	Bone morphogenetic protein, BMP6	BMP6	G
	Bone morphogenetic protein, BMP7		G
		BMP7	G
	Bone morphogenetic protein, BMP8	BMP8	G
	Brain derived neurotrophic factor	BDNF	G
	Brain derived neurotrophic factor (BDNF)	BDNFR	G
	receptor		
	Branched chain aminotransferase 1, cytosolic	BCAT1	Ε
	Branched chain aminotransferase 2,	BCAT2	Ε
	mitochondrial		
	BRCA1-associated RING domain gene 1	BARD1	G
	Breakpoint cluster region	BCR	G
	Breast cancer 1	BRCA1	G
	Breast cancer 2	BRCA2	G
	Breast cancer, ductal, 1	BRCD1	G
	Breast cancer, ductal, 2	BRCD2	G
	Bruton agammaglobulinaemia tyrosine kinase	BTK	G
	Butyrylcholinesterase	BCHE	Ε
	C3 convertase	·	E
	Ca(2+) transporting ATPase, fast twitch	ATP2A1	T
(Ca(2+) transporting ATPase, slow twitch	ATP2A2	Ť
(Cadherin E	CDH1	Ġ
(Cadherin EP		Ğ
(Cadherin N	CDH2	G
(Cadherin P	CDH3	G
(Calbindin 1	CALB1	G
(Calbindin D9K	CALB3	Ğ
(Calcium channel, voltage-dependent, alpha 1F		N
	subunit		14
(Calcium channel, voltage-dependent, Alpha-	CACNA1B	N
	B (CACNL1A5)		14
	Calcium channel, voltage-dependent, Alpha-	CACNA1C	A.I
	C	CACITATO	Ν
	Calcium channel, voltage-dependent, Alpha-	CACNA1D	
	D	CACNAID	N
	Calcium channel, voltage-dependent, Alpha-	CACNA1E	
	E (CACNL1A6)	CACNATE	N
		CACNAC	
2	Calcium channel, voltage-dependent, Alpha-	CACNA2	Ν
	Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
	Calcium channel, voltage-dependent, Beta 3	CACNB3	Ν
	Calcium channel, voltage-dependent, L type,	CACNA1S	Ν
	lpha 1S subunit		
		CACNG2	Ν
	leuronal, Gamma		
C	Calcium channel, voltage-dependent, P/Q	CACNA1A	Ν

type, alpha 1A subunit		
Calcium channel, voltage-dependent, T-type		N
Calcium sensing receptor	CASR	T
Calmodulin 1	CALM1	Ġ
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin dependant kinase	OVEINIO	
Calmodulin-dependant protein kinase II	CAMK2A	. T
Calnexin	CANX	G
Calpain	CAPN, CAPN3	G
Canalicular multispecific organic anion	CMOAT	E
transporter	CIVIOAT	,
Carbamoylphosphate synthetase 1	CPS1	_
Carbamoylphosphate synthetase 2	CPS2	E
Carbonic anhydrase 3	CA3	E E
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	Ē
Carbonic anhydrase, beta	CA2	E
Cardiac-specific homeobox, CSX	CSX	G
Carnitine acetyltransferase	CRAT	E
Carnitine acylcarnitine translocase	CACT	E
Carnitine transporter protein	CDSP, SCD	T
Cartilage oligomeric matrix protein	COMP, EDM1,	N
- and a superior of the superi	PSACH	
Cartilage-hair hypoplasia gene	CHH	N
Caspase 1	CASP1	G
Caspase 10	CASP10	Ğ
Caspase 2	CASP2	Ğ
Caspase 3	CASP3	Ğ
Caspase 4	CASP4	Ğ
Caspase 5	CASP5	G
Caspase 6	CASP6	G
Caspase 7	CASP7	G
Caspase 8	CASP8	G
Caspase 9	CASP9	G
Catechol-O-methyltransferase	COMT	Ε
Catenin, alpha	CTNNA1	G
Catenin, beta	CTNNB1	• • • • • G
Catenin, gamma		G
Cathepsin K	CTSK	Ε
Caveolin 3	CAV3	Ε
CD1	CD1	1
CD44	CD44	1
Cdc 25 phosphatase		G
Cdc2	CDC2	G
CDX1		G
CEA		G
Cell adhesion molecule, intercellular, ICAM	ICAM1	G

Cell adhesion molecule, leukocyte-endothelial, LECAM (CD62)	LECAM1	G
Cell adhesion molecule, liver, LCAM	LCAM	_
Cell adhesion molecule, neural, NCAM1	NCAM1	G
Cell adhesion molecule, neural, NCAM120	NCAM120	G
Cell adhesion molecule, neural, NCAM2	NCAM2	G
Cell adhesion molecule, platelet-endothelial,	· -	G
PECAM	PECAM1	G
Cell adhesion molecule, vascular, VCAM	VCANA	_
Cellubrevin	VCAM1	G
c-erbB1	CEB	Ν
c-erbB2	ERBB1	G
c-erbB3	ERBB2	G
	ERBB3	G
c-erbB4	ERBB4	G
Ceroid lipofuscinosis neuronal 2	CLN2	Ν
Ceroid lipofuscinosis neuronal 3	CLN3	Ν
Ceroid lipofuscinosis neuronal 4	CLN4	Ν
Ceroid lipofuscinosis neuronal 5	CLN5	N
Ceroid lipofuscinosis neuronal 6	CLN6	Ν
Chediak-Higashi syndrome 1 gene	CHS1	T
Chemokine MCAF	MCAF	1
Chemokine receptor CCR2	CCR2	-
Chemokine receptor CCR3	CCR3	l
Chemokine receptor CCR5	CCR5	1
Chemokine receptor CXCR1	CXCR1	1
Chemokine receptor CXCR2	CXCR2	i
Chemokine receptor CXCR4	CXCR4	1
Chloride channel 5	CLCN5	S
Cholestasis, progressive familial intrahepatic 1	FIC1	G
gene		
Cholesterol ester transfer protein	CETP	T
Choline acetyltransferase	CHAT	Ε
Choroideremia gene	CHM	S
Chromogranin A	CHGA	G
Ciliary neurotrophic factor (CNTF)	CNTF	Ğ
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	G
c-kit receptor tyrosine kinase		Ğ
Clathrin	১১ ৬ - ১৯১১	T.
Cleavage signal-1 protein	CS1	Ġ
Cleft palate gene	CPX	Ğ
Clusterin	CLU	Ğ
CoA transferase		E
Cochlin	СОСН	ī
Cockayne syndrome gene, CKN1	CKN1	Ġ
Collagen I alpha 1	COL1A1	
Collagen I alpha 2	COL1A2	9
Collagen II alpha 1	COL2A1	S S S
Collagen III alpha 1	COL3A1	0
• · · · · · · · ·		J

Collagen IV alpha 1	COL4A1	S
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	9
Collagen IV alpha 6	COL4A6	9
Collagen IX alpha 2	COL9A2, EDM2	\$ \$ \$ \$
Collagen IX alpha 3	COL9A3	S
Collagen receptor	COLR	0
Collagen V alpha 1	COL5A1	S S
Collagen V alpha 2	COL5A2	9
Collagen VI alpha 1	COL6A1	. o
Collagen VI alpha 2	COL6A2	S .
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	\$ \$ \$ \$
Collagen X alpha 1	COL10A1	S
Collagen X alpha 1	COL11A1	9
Collagen XI alpha 2	COL11A2	S
Collagen XVII alpha 1	COL17A1	S
Collagenic-like tail subunit of asymmetric	COLQ	E
acetylcholinesterase		L-,
Collapsin		G
Colony-stimulating factor 1	CSF1	Ğ
Colony-stimulating factor 1 receptor	CSF1R	Ğ
Colony-stimulating factor 2	CSF2	Ğ
Colony-stimulating factor 2 alpha receptor	CSF2RA	G
Colony-stimulating factor 2 beta receptor	CSF2RB	G
Colony-stimulating factor 3	CSF3	G
Colony-stimulating factor 3 receptor	CSF3R	G
Complex V	MTATP6	Ε
Cone-rod homeobox-containing gene	CRX	G
Contactin	CNTN1	G
Core-binding factor, alpha 1	CBFA1	G
Core-binding factor, alpha 2	CBFA2	G
Core-binding factor, beta	CBFB	G
Corticotrophin-releasing hormone	CRH	Т
Corticotrophin-releasing hormone receptor	CRHR1	T
Creatine kinase – B and m	CKBE	Ε
Creb binding protein	CREBBP	G
Cryptochrome 1	CRY1	S
Cryptochrome 2	CRY2	S S
Crystallin, alpha A	CRYAA	S
Crystallin, alpha B	CRYAB	S
Crystallin, beta B2	CRYBB2	S
Crystallin, gamma A	CRYGA	S
c-src tyrosine kinase	CSK	G
Cu2+ transporting ATPase alpha polypeptide	ATP7A	Ε
Cu2+ transporting ATPase beta polypeptide	ATP7B	Ε

Cubilin Cyclic AMP response element binding protein Cyclic AMP response element modulator Cyclic AMP-dependent protein kinase Cyclic nucleotide gated channel alpha 1, CNGA1	CUBN CREB CREM PKA CNGA1	T G G E N
Cyclic nucleotide gated channel alpha 3, CNGA3	CNGA3	Ν
Cyclic nucleotide phosphodiesterase 1B Cyclic nucleotide phosphodiesterase 1B1 Cyclic nucleotide phosphodiesterase 2A3 Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B Cyclic nucleotide phosphodiesterase 4A Cyclic nucleotide phosphodiesterase 4C Cyclic nucleotide phosphodiesterase 5A Cyclic nucleotide phosphodiesterase 6A Cyclic nucleotide phosphodiesterase 6B Cyclic nucleotide phosphodiesterase 7 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclin A Cyclin B Cyclin C Cyclin E Cyclin-dependent kinase 1 Cyclin-dependent kinase 1 Cyclin-dependent kinase 3 Cyclin-dependent kinase 3 Cyclin-dependent kinase 4 Cyclin-dependent kinase 5 Cyclin-dependent kinase 6 Cyclin-dependent kinase 7 Cyclin-dependent kinase 8 Cyclin-dependent kinase 9	PDE1B PDE1B1 PDE2A3 PDE3A PDE3B PDE4A PDE4C PDE5A PDE6B PDE7 PDE8 PDE9A CCNA CCNB CCNC CCND1 CCNE CCNF CDK1 CDK1 CDK2 CDK3 CDK4 CDK5 CDK6 CDK7 CDK8 CDK7 CDK8 CDK9	
Cyclin-dependent kinase inhibitor 1A (P21, CIP1)	CDKN1A	G
Cyclin-dependent kinase inhibitor 1B (P27, KIP1)	CDKN1B	G
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN1C	G
Cyclin-dependent kinase inhibitor 2A (p16) Cyclin-dependent kinase inhibitor 3 Cyclooxygenase 1 Cyclooxygenase 2 CYP11A1	CDKN2A CDKN3 COX1 COX2 CYP11A1	GGEEE

CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1A1 CYP1A2 CYP1B1 CYP21 CYP24 CYP27 CYP27B1 CYP2A1 CYP2A1 CYP2A3 CYP2A3 CYP2A6V2 CYP2A6V CYP2C18 CYP2C18 CYP2C19 CYP2CB CYP2C9 CYP2D6 CYP2E1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4B1 CYP4F2 CYP4F3 CYP5A1 CYP5A1 CYP7A CYP8 Cystathionase	CYP11B1 CYP11B2 CYP17 CYP19 CYP1A1 CYP1A2 CYP1A1 CYP2B1 CYP24 CYP27 PDDR CYP2A1 CYP2A1 CYP2A3 CYP2A3 CYP2A6V2 CYP2A7 CYP2B6 CYP2C18 CYP2C18 CYP2C19 CYP2C8 CYP2C9 CYP2C9 CYP2C9 CYP2B1 CYP2C9 CYP2C9 CYP2B1 CYP2C9 CYP2B1 CYP2B1 CYP2B1 CYP2B1 CYP2B1 CYP2B1 CYP2B1 CYP2B1 CYP2B1 CYP2B1 CYP3B3 CYP3B4 CYP3B4 CYP3B5 CYP3B4 CYP3B5 CYP3B7 CYP4B1 CYP5B1 C	
Cystinosin Cytidine deaminase	CTNS CDA	Ţ
Cytochrome b-245 alpha	CYBA	E
Cytochrome b-245 beta	CYBB	E
		Ē
Cytochrome b-5	CYB5	Ε
DAX1 nuclear receptor	DAX1	ı
Deafness autosomal dominant 5	DFNA5	N
		-

Deafness dystonia peptide	DDP N
Defender against cell death 1	DAD1 G
Deleted in azoospermia	DAZ G
Deleted in colorectal carcinoma	DCC G
Deleted in malignant brain tumous	
Delta aminolevulinate dehydratas	•
Delta(4)-3-oxosteroid 5-beta-redu	
Delta-7-dehydrocholesterol reduc	
Dentin sialophosphoprotein	DSPP G
Deoxyuridine triphosphatase; dUl	
Desert hedgehog, dhh	G
DHEA sulfotransferase	STD E
Diaphanous 1	DIAPH1 N
Diaphanous 2	DIAPH2 N
Diastrophic dysplasia sulfate trans	
Dihydrolipoamide branched chain	
Dihydrolipoamide dehydrogenase	
Dihydrolipositiide derrydrogenase 2	
Dihydrolipoyl transacetylase	PDHA E
Dihydroorotase	- E
Dihydroxyacetonephosphate acylt	
Disrupted meiotic cDNA 1, homolo	
Distal-less homeobox 1	
Distal-less homeobox 2	_
Distal-less homeobox 3	DLX2 G DLX3 G
Distal-less homeobox 4	DLX4 G
Distal-less homeobox 5	DLX5 G
Distal-less homeobox 6	DLX6 G
DNA damage binding protein, DDI	-
DNA damage binding protein, DDI	_
DNA directed polymerase, alpha	_
DNA glycosylases	POLA E
DNA helicases	E
DNA Ligase 1	LIG1 E
DNA methyltransferase	DNIAT
DNA polymerase 1	
DNA polymerase 2	Ē
DNA polymerase 3	<u>E</u>
DNA primase	E .
DNA-damage-inducible transcript	B DDIT3 S
DNA-dependent RNA polymerase	
DOPA decarboxylase	DDC E
Doublecortin, DCX	-
Duffy blood group	•
Dynamin	<u> </u>
Dynein	
Dyskerin	DKC1 S
Dystonia 1	DKC1 S DYT1 S
Dysionia i	ווזע

Dystonia 3 Dystonia 6 Dystonia 7 Dystonia 9 Dystrophia myotonica Dystrophia myotonica, atypical Dystrophin Dystrophin-associated glycoprotein 35kD, SCGD	DYT3 DYT6 DYT7 CSE DM, DMPK DM2 DMD SGCD	SSSSEESS
Dystrophin-associated glycoprotein 35kD, SGSG	SGCG	S
Dystrophin-associated glycoprotein 43kD Dystrophin-associated glycoprotein 50kD E74-like factor 1, ELF1 EB1	SGCB SGCA ELF1	S S G
Ectodermal Dysplasia 1 gene Electron-transfering-flavoprotein alpha Electron-transfering-flavoprotein beta Electron-transferring flavoprotein dehydrogenase	ED1 ETFA ETFB ETFDH	S T T E
Empty spiracles (drosophila) homologue 1 Empty spiracles (drosophila) homologue 2 Endobrevin Endocardial fibroelastosis 2 gene Endometrial bleeding-associated factor Endothelin 1 Endothelin 2 Endothelin 3 Endothelin converting enzyme Endothelin receptor type A Endothelin receptor type B Engrailed-1 Engrailed-2 Enolase Enoyl CoA isomerase	EMX1 EMX2 VAMP8 EFE2 EBAF EDN1 EDN2 EDN3 ECE1 EDNRA EDNRB EN1 EN2 EN01	0
Enterokinase Ephrin receptor tyrosine kinase A Ephrin receptor tyrosine kinase B Ephrin-A Ephrin-B Epidermal growth factor Epidermal growth factor receptor Epilepsy, benign neonatal 4 gene Epilepsy, female restricted Epilepsy, progressive myoclonic 2 gene Erythrocyte membrane protein band 4.1 Erythrocyte membrane protein band 4.2 Erythrocyte membrane protein band 7.2	PRSS7, ENTK EPHA EPHB EFNA EFNB EGF EGFR ICCA EFMR EPM2A EPB41 EPB42 EPB72	н н о о о о о ы н н о о о

Erythroid kruppel-like factor Erythropoietin Erythropoietin receptor Estrogen receptor Eukaryotic initiation translation factor EWS RNA-binding protein Excision repair complementation group 1 protein	EKLF EPO EPOR ESR EIF4E EWSR1 ERCC1	G G G G E
Excision repair complementation group 2 protein	ERCC2	Ε
Excision repair complementation group 2 protein	ERCC3	Ε
Excision repair complementation group 4	ERCC4	Е
Excision repair complementation group 6	ERCC6	Ε
protein Exostosin 1	EXT1	s
Exostosin 2	EXT2	Š
Exostosin 3	EXT3	s
Eyes absent 1	EYA1	Ğ
Eyes absent 2	EYA2	G
Eyes absent 3	EYA3	G
Faciogenital dysplasia	FGD1, FGDY	T
Factor 1 (No. one)	F1	1
Factor B, properdin		1
Factor D		1
Factor H	HF1	1
Factor I (letter I)	iF	1
Factor III	F3	1
Factor IX	F9	i
Factor V	F5	1
Factor VII	F7	- 1
Factor VIII	F8 -	ı
Factor X	F10	l
Factor XI	F11	ı
Factor XII	F12	ł
Factor XIII A & B	F13A & F13B	- 1
Fanconi anemia, complementation group A	FANCA	
Fanconi anemia, complementation group C	FANCC	T
Fanconi anemia, complementation group D	FANCD	T
Fc fragment of IgG, high affinity IA, receptor for		G
Fc fragment of lgG, low affinity IIa, receptor for (CD32)	FCGR2A	G
Fc fragment of IgG, low affinity Illa, receptor for	FCGR3A	G
(CD16) Fc receptor		ı
Fertilin protein	FTNB	Ġ
Fibrillin 1	FBN1	G
IOFMOT		•

F1 111 0			
Fibrillin 2	FBN2		G
Fibroblast growth factor	FGF1		G
Fibroblast growth factor receptor 1	FGFR1		G
Fibroblast growth factor receptor 2	FGFR2		G
Fibroblast growth factor receptor 3	FGFR3		G
Fibronectin precursor	FN1		G
Flavin-containing monooxygenase 1	FMO1		E
Flavin-containing monooxygenase 2	FMO2		E
Flavin-containing monooxygenase 3	FMO3		E
Flavin-containing monooxygenase 4	FMO4		E
Flightless-II, Drosophila homolog of	FLII		Ğ
Folic acid receptor	FOLR		Ğ
Follicle stimulating hormone receptor	FSHR, ODG1		Ğ
Follicle stimulating hormone, FSH	FSHB		G
Follicular lymphoma variant translocation 1	FVT1		1
Follistatin			Ġ
Forkhead rhabdomyosarcoma gene	FKHR		G
Forkhead transcription factor 10	FKHL10		G
Forkhead transcription factor 14	FKHL14		G
Forkhead transcription factor 7	FKHL7		G
Formiminotransferase		•	E
Fragile site, folic acid type, rare, fra(X) A	FRAXA		N
Fragile site, folic acid type, rare, fra(X) E	FRAXE	~	N
Fragile site, folic acid type, rare, fra(X) F	FRAXF	<i>~</i>	N
Frataxin	FRDA		G
Fringe secreted protein, lunatic	LFNG		G
Fringe secreted protein, manic	MFNG		G
Fringe secreted protein, radical	RFNG		G
Fructose-1,6-diphosphatase	FBP1		E
Fucosyltransferase 6	FUT6		T
Fukuyama type congenital muscular dystrophy	FCMD		Ġ
Fumarase	FH		E
Fumarylacetoacetase	FAH		E
G/T mismatch binding protein	GTBP, MSH6		G
GABA receptor, alpha 1	GABRA1	•	
GABA receptor, alpha 2	GABRA2		N
GABA receptor, alpha 3	GABRA3		N
GABA receptor, alpha 3	GABRA4	در ایسود یواوجه	N
GABA receptor, alpha 5	GABRA5		N
GABA receptor, alpha 6	GABRA6		N
GABA receptor, beta 1	GABRB1		N
GABA receptor, beta 1 GABA receptor, beta 2	GABRB2		N
GABA receptor, beta 2 GABA receptor, beta 3			N
•	GABRB3		N
GABA receptor, gamma 1	GABRG1		N
GABA receptor, gamma 2	GABRG2		N
GABA receptor, gamma 3	GABRG3		N
GABA transaminase	ABAT		E
Gadd45 (growth arrest & DNA-damage-inducible	e protein)		E

	•	
Galactocerebrosidase	GALC	E
Galactokinase	GALK1	Ē
Galactose 1-phosphate uridyl-transferase	GALT	E
Galactosyltransferase 1	GT1	G
Galactosyltransferase, alpha 1,3	GGTA1	G
Galactosyltransferase, beta 3	B3GALT	G
Galanin	GAL	N
Galanin receptor	GALNR1	N
Gamma-glutamyl carboxylase	GGCX	T
Gap junction protein alpha 1	GJA1	Ť
Gap junction protein alpha 3	GJA3	Ť
Gap junction protein alpha 8	GJA8	Ť
Gap junction protein beta 1	GJB1	Ť
Gap junction protein beta 2	GJB2	Ť
Gap junction protein beta 3	GJB3	Ť
Gastric Intrinsic factor, GIF	GIF	Ė
Gastrin	GAS	G
Gastrin releasing peptide	GRP	Т
Gastrointestinal tumor-associated antigen 1	GA733	i
Gastrulation brain homeobox 2	GBX2	Ġ
GDP dissociation inhibitor 1	GDI1	Ğ
Gelsolin	GSN	Ğ
Geniospasm 1	GSM1	Ğ
Gephyrin		N-
Glial-cell derived neurotrophic factor (GDNF)		Ν
receptor		
Glial-cell derived neurotrophic factor, GDNF	GDNF	N
Glioma chloride ion channel, GCC		G
Glucagon receptor	GCGR	G
Glucagon-like peptide receptor 1	GLP1R	G
Glucocorticoid receptor	GRL	G
Glucose-6-phosphatase translocase	G6PT1	Ε
Glucosidase, acid alpha	GAA	Ε
Glucosidase, acid beta	GBA	Ε
Glutamate decarboxylase, GAD	GAD1	Ε
Glutamate-cysteine ligase	GLCLC	Ε
Glutathione	GSH	Т
Glutathione peroxidase, GPX1	GPX1	Ε
Glutathione peroxidase, GPX2	GPX2	Ε
Glutathione reductase, GSR	GSR	E E
Glutathione S-transferase mu 1, GSTM1	GSTM1	Ε
Glutathione S-transferase mu 4, GSTM4		Ε
Glutathione S-transferase theta 1, GSTT1	GSTT1	E
Glutathione S-transferase theta 2, GSTT2	COTD	E
Glutathione S-transferase, GSTP1	GSTP1	E
Glutathione S-transferase, GSTZ1	GSTZ1	Ε
Glutathione synthetase	GSS	Ε
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	Ε

GAPDH	·	
Glycerol kinase	GK	Æ
Glycinamide ribonucleotide (GAR)	GART	Ē
transformylase	•	_
Glycine dehydrogenase	GLDC	Е
Glycine receptor, alpha	GLRA2	N
Glycine receptor, beta		N
Glycogen branching enzyme	GBE1	E
Glycogen phosphorylase	PYGL	E
Glycogen synthase 1 (muscle)	GLYS1	E
Glycogen synthase 2 (liver)	GYS2	E
Glycosyltransferases, ABO blood group	ABO	Ē
Glypican 3	GPC3, SDYS	Ğ
GM2 ganglioside activator protein, GM2A	GM2A	Ē
Gonadotropin releasing hormone	GNRH	Ğ
Gonadotropin releasing hormone receptor	GNRHR	Ğ
Goosecoid GSC		Ğ
Green cone pigment	GCP ·	Š
Growth arrest-specific homeobox	GAX	Ğ
Growth factor receptor-bound protein 2	GRB2	Ğ
Growth hormone 1	GH1	Ğ
Growth hormone 2 (placental)	GH2	G
Growth hormone receptor	GHR	G
Growth hormone releasing hormone (GHRH)	GHRH	G
Growth hormone releasing hormone receptor	GHRHR	G
Growth/differentiation factor 5	GDF5	G
Growth-regulated protein precursor, GRO	GRO	- 1
GTP cylcohydrolase 1	GCH1	G
GTPase-activating protein, GAP	RASA1	G
Guanidinoacetate N-methyltransferase	GAMT	E
Guanine nucleotide-binding protein, alpha	GNAO1	Ν
activating activity polypeptide, GNAO		
Guanine nucleotide-binding protein, alpha	GNAI1	Ν
inhibiting activity polypeptide 1, GNAI1		
Guanine nucleotide-binding protein, alpha	GNAI2	Ν
inhibiting activity polypeptide 2, GNAI2		
Guanine nucleotide-binding protein, alpha	GNAI3	Ν
inhibiting activity polypeptide 3, GNAI3	• • •	
Guanine nucleotide-binding protein, alpha	GNAS1	Ν
stimulating activity polypeptide, GNAS1		
Guanine nucleotide-binding protein, alpha	GNAS2	Ν
stimulating activity polypeptide, GNAS2		
Guanine nucleotide-binding protein, alpha	GNAS3	N
stimulating activity polypeptide, GNAS3		
Guanine nucleotide-binding protein, alpha	GNAS4	Ν
stimulating activity polypeptide, GNAS4		
Guanine nucleotide-binding protein, alpha	GNAT1	Ν
transducing activity polypeptide, GNAT1		

Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2		N
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3		N
Guanine nucleotide-binding protein, gamma	GNG5		N
polypeptide 5 Guanine nucleotide-binding protein, q polypeptide	GNAQ		N
Guanylate cyclase 2D, membrane (retinaspecific)	GUCY2D		E
Guanylate cyclase activator 1A (retina) Guanylate kinase	GUCA1A		E
Gustducin, alpha (taste-specific G protein) Haeme regulated inhibitor kinase	GDCA		E N E
Haemoglobin epsilon Hairless	HR		Τ
Haptoglobin, alpha 1	HPA1		G
Haptoglobin, alpha 2			
Haptoglobin, beta	HPA2		!
Heat shock protein, HSP60	HPB		- !
Heat shock protein, HSP70		•	- 1
			1
Heat shock protein, HSP90			İ
Heat shock protein, HSPA1			I
Heat shock protein, HSPA2			1
Hela tumor suppression gene	HTS1		G
Hemochromatosis	HFE		T
Hemopexin	HPX		1
Heparan sulfamidase			Ε
Heparin binding epidermal growth factor	HBEGF		G
Hepatic nuclear factor-3-beta	HNF3B		Ε
Hepatic nuclear factor-4-alpha	HNF4A		Ε
Hepatitis B virus integration site 1	HVBS1		1
Hepatitis B virus integration site 2	HVBS6		1
Hepatocyte growth factor	HGF		G
Hexosaminidase A	HEXA,TSD		Ē
Hexosaminidase B	HEXB		Ē
High mobility group protein 1	HMG1		Ğ
High mobility group protein 2	HMG2		Ğ
High mobility group protein C	HMGIC		Ğ
High mobility group protein Y	HMGIY		Ğ
Histone family H1	H1		G
Histone family H2	H2		G
Histone family H3	H3		G
Histone family H4	H4		G
HLA-B associated transcript 1	BAT1		1
HLH transcription factor HAND1	HAND1		
HLH transcription factor HAND2	HAND2		G
HMG-CoA lyase	HMGCL		G
THE CONTINUE .	INIGOL		E

	HMG-CoA reductase	HMGCR	Ε
	HMG-CoA synthase	HMGCS2	Ē
	Holocarboxylase synthetase	HLCS	E
	Holoprosencephaly 1	HPE1	G
	Holoprosencephaly 2	HPE2	G
	Holoprosencephaly 3	HPE3	G
	Holoprosencephaly 4	HPE4	G
	Homeobox (HOX) gene A1	HOXA1	G
	Homeobox (HOX) gene A10	HOXA10	G
	Homeobox (HOX) gene A11	HOXA11	G
	Homeobox (HOX) gene A12	HOXA12	G
	Homeobox (HOX) gene A13	HOXA13	G
	Homeobox (HOX) gene A2	HOXA2	G
	Homeobox (HOX) gene A3	HOXA3	G
	Homeobox (HOX) gene A4	HOXA4	G
	Homeobox (HOX) gene A5	HOXA5	Ğ
	Homeobox (HOX) gene A6	HOXA6	G
	Homeobox (HOX) gene A7	HOXA7	G
	Homeobox (HOX) gene A8	HOXA8	Ğ
	Homeobox (HOX) gene A9	HOXA9	Ğ
	Homeobox (HOX) gene B1	HOXB1	Ğ
	Homeobox (HOX) gene B2	HOXB2	Ğ
	Homeobox (HOX) gene B3	HOXB3	Ğ
	Homeobox (HOX) gene B4	HOXB4	Ğ
	Homeobox (HOX) gene B5	HOXB5	Ğ
	Homeobox (HOX) gene B6	HOXB6	Ğ
	Homeobox (HOX) gene B7	HOXB7	G
	Homeobox (HOX) gene B8	HOXB8	G
	Homeobox (HOX) gene B9	HOXB9	G
	Homeobox (HOX) gene C13	HOXC13	G
	Homeobox (HOX) gene C4	HOXC4	G
	Homeobox (HOX) gene C8	HOXC8	G
	Homeobox (HOX) gene C9	HOXC9	G
	Homeobox (HOX) gene D1	HOXD1	G
	Homeobox (HOX) gene D10	HOXD10	G
	Homeobox (HOX) gene D12	HOXD12	G
	Homeobox (HOX) gene D13	HOXD13	G
	Homeobox (HOX) gene D3	HOXD3	G
	Homeobox (HOX) gene D4	HOXD4	G
	Homeobox (HOX) gene D8	HOXD8	G
	Homeobox (HOX) gene D9	HOXD9	G
	Homeobox 11	HOX11	G
	Homeobox HB24	HLX1	G
	Homeobox HB9	HLXB9	G
	Homeobox, PROX1	PROX1	G
	HSSB, replication protein		Ε
	Human atonal gene	ATOH1	G
i	Human chorionic gonadtrophin, hCG	CG	G

Human placental lactogen	CSH1	G
Huntingtin	HD	T
Hypoxanthine-guanine	HPRT	Ė
phosphoribosyltransferase, HGPRT		_
Hypoxia inducible factor 1	HIF1A	Ε
Hypoxia inducible factor 2		Ē
IC7 A and B		- 1
Iduronate 2 sulphatase	IDS	Ë
Ikaros gene	IKAROS	G
Immunoglobulin alpha (IgA)	IGHA	1
Immunoglobulin delta (IgD)	IGHD	
Immunoglobulin E (IgE) reponsiveness gene	IGER	. 1
Immunoglobulin E (IgE) serum concentration	IGES	
regulator gene	1020	ſ
Immunoglobulin epsilon (IgE)	IGHE	
Immunoglobulin gamma (IgG) 2	IGHG2	
Immunoglobulin heavy mu chain	IGHM	
Immunoglobulin J polypeptide	IGJ	1
Immunoglobulin kappa constant region	IGKC	1
Immunoglobulin kappa variable region	IGKV	1
Indian hedgehog, ihh	IHH	1
Inhibin, alpha	INHA	G
Inhibin, beta A	INHBA	G
Inhibin, beta B	INHBB	G
Inhibin, beta C	INHBC	G
Inosine monophosphate dehydrogenase,	INIBC	G E
IMPDH		_
Inositol 1,4,5-triphosphate receptor 1	ITPR1	6
Inositol 1,4,5-triphosphate receptor 3	ITPR3	G
Insulin	INS	G
Insulin promotor factor 1	IPF1	G G
Insulin receptor	INSR	G
Insulin receptor substrate-1	IRS1	
Insulin-like growth factor 1	IGF1	G G
Insulin-like growth factor 1 receptor	IGF1R	
Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	G
Integrin beta 2	ITGB2	G
Integrin beta 3	ITGB3	G G
Integrin beta 4	ITGB4	
Integrin beta 5	ITGB5	G
Integrin beta 6	ITGB6	G
Integrin beta 7	ITGB7	G
Integrin, alpha 1	ITGA1	G
Integrin, alpha 2	ITGA2	G
Integrin, alpha 3	ITGA2	G
Integrin, alpha 3		G
mognin, aipna +	ITGA4	G

Integrin, alpha 5	ITGA5	G
Integrin, alpha 6	ITGA6	G
Integrin, alpha 7	ITGA7	G
Integrin, alpha 8	ITGA8	G
Integrin, alpha 9	ITGA9	G
Integrin, alpha M	ITGAM	G
Integrin, alpha X	ITGAX	G
Inter-alpha-trypsin inhibitor, IATI		Е
Intercellular adhesion molecule 1	ICAM1	ı
Intercellular adhesion molecule 2	ICAM2	Ι
Intercellular adhesion molecule 3	ICAM3	1
Interferon alpha	IFNA1	1
Interferon beta	IFNB	i
Interferon gamma	IFNG	İ
Interferon gamma receptor 1	IFNGR1	i
Interferon gamma receptor 2	IFNGR2	i
Interferon regulatory factor 1	IRF1	i
Interferon regulatory factor 4	IRF4	i
Interleukin(IL) 1 receptor	IL1R	i
Interleukin(IL) 1, alpha	IL1A	i
Interleukin(IL) 1, beta	IL1B	i
Interleukin(IL) 10	IL10	i
Interleukin(IL) 10 receptor	IL10R	Ī
Interleukin(IL) 11	IL11	Ī
Interleukin(IL) 11 receptor	IL11R	1
Interleukin(IL) 12	IL12	1
Interleukin(IL) 12 receptor, beta 1	IL12RB1	ı
Interleukin(IL) 13	IL13	1
Interleukin(IL) 13 receptor	IL13R	ı
Interleukin(IL) 2	IL2	ı
Interleukin(IL) 2 receptor, alpha	IL2RA	ı
Interleukin(IL) 2 receptor, gamma	IL2RG	1
Interleukin(IL) 3	IL3	ı
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	1
Interleukin(IL) 4 receptor	IL4R	1
Interleukin(IL) 5	IL5	ı
Interleukin(IL) 5 receptor	IL5R	1
Interleukin(IL) 6	IL6	ı
Interleukin(IL) 6 receptor	IL6R	Ī
Interleukin(IL) 7	IL7	ı
Interleukin(IL) 7 receptor	IL7R	ŀ
Interleukin(IL) 8	IL8	i
Interleukin(IL) 8 receptor	IL8R	i
Interleukin(IL) 9	IL9	l
Interleukin(IL) 9 receptor	IL9R	i
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	1
IP3 kinase		Ė

Isocitrate dehydrogenase			Ε
Isovaleric acid CoA dehydrogenase	IVD		Ε
Janus kinase 1	JAK1		G
Janus kinase 2	JAK2		G
Janus kinase 3	JAK3		G
Kallman syndrome gene 1	KAL1		G
Kell blood group precursor	XK, KEL		Т
Keratin 1	KRT1		S
Keratin 10	KRT10		S S
Keratin 11	KRT11		S
Keratin 12	KRT12		Š
Keratin 13	KRT13		Š
Keratin 14	KRT14		S
Keratin 15	KRT15		S
Keratin 16	KRT16		S
Keratin 17	KRT17.PCHC1		S
Keratin 18	KRT18		S
Keratin 2	KRT2		S
Keratin 3	KRT3		S
Keratin 4	KRT4		S
Keratin 5	KRT5		S
Keratin 6	KRT6		S
Keratin 7	KRT7		S
Keratin 8	KRT8		၁
Keratin 9	KRT9		S
Ketohexokinase	KHK		S E
Kinectin	KTN1		
Kinesin, heavy chain	KNSL1		G
Kinesin, light chain	KNS2		G
L1 cell adhesion molecule			G
Lactotransferrin	L1CAM		N
Lamin A/C	LTF		T
Laminin 5, alpha 3	LMNA		G
	LAMA3		G
Laminin 5, beta 3	LAMB3		G
Laminin 5, gamma 2 Laminin M	LAMC2		G
	LAMM		G
Laminin receptor 1	LAMR1		G
Latent transforming growth factor-beta binding	LIBP2		G
protein 2	. ==		
Leptin	LEP		G
	LEPR		G
Leukaemia inhibitory factor	LIF		G
Leukaemia inhibitory factor receptor	LIFR	(G
Leukin			I
Leukocyte-specific transcript 1	LST-1		i
Leukotriene A4 hydrolase			1
	LTA4S	!	Ε
Leukotriene B4 receptor			i

	Leukotriene B4 synthase	LTB4S		E
	Leukotriene C4 receptor			1
	Leukotriene C4 synthase	LTC4S		Ε
	Leukotriene D4/E4 receptor			- 1
	LH/choriogonadotropin (CG) receptor	LHCGR		G
	LIM homeobox protein 1	LHX1		G
	LIM homeobox protein 2	LHX2		G
	LIM homeobox protein 3	LHX3		G
	LIM homeobox protein 4	LHX4		G
	LIM homeobox transcription factor 1, beta	LMX1B		Ğ
	Limb girdle muscular dystrophy 1A	LGMD1A		G
-	Limb girdle muscular dystrophy 1B	LGMD1B		G
	Limb girdle muscular dystrophy 2G	LGMD2G		G
	Limb girdle muscular dystrophy 2H	LGMD2H		G
	Limbic associated membrane protein	LAMP		G
	LIM-domain only protein 1	LMO1		Ğ
	LIM-domain only protein 2	LMO2		G
	LIM-domain only protein 3	LMO3		Ğ
	LIM-domain only protein 4	LMO4		Ğ
	Lipoma-preferred partner gene	LPP		Ğ
	Lipoprotein receptor, Low Density	LDLR	*	T
	Lipoxygenase 12 (platelets)	LOG12		Ī
	Lipoxygenase 5 (leukocytes)			1
	Long QT-type 2 potassium channels	LQT2, KCNH2		Т
	Loricrin	LOR		S
	Low density lipoprotein receptor-related protein	LRP		Ŧ
	precursor			
	Luteinizing hormone, beta chain	LHB		G
	Lymphoblastic leukemia derived sequence 1	LYL1		İ
	Lymphocyte-specific protein tyrosine kinase	LCK		1
	Lymphoid enhancer-binding factor	LEF-1		G
	Lysosome-associated membrane protein 1	LAMP1		G
	Lysosome-associated membrane protein 2	LAMP2		G
	MAD (mothers against decapentaplegic,	MADH2		G
	Drosophila) homologue 2			
	MAD (mothers against decapentaplegic,	MADH3		G
	Drosophila) homologue 3			
	MAD (mothers against decapentaplegic,	MADH4	4.874	G [.]
	Drosophila) homologue 4			
	MADS box transcription-enhancer factor 2A	MEF2A		G
		MEF2B		G
	MADS box transcription-enhancer factor 2C	MEF2C		G
	MADS box transcription-enhancer factor 2D	MEF2D		G
	Malate dehydrogenase, mitochondrial	MDH2		Ε
	Malignant proliferation, eosinophil gene	MPE		ſ
	Malonyi CoA decarboxylase			Ε
	Malonyl CoA transferase			Ε
	Mannosidase, alpha B lysosomal	MANB		Ε

Mannosidase, beta A lysosomal	MANBA	Ε
MAPK kinase 1	MAPKK1; MEK1	G
MAPK kinase 4	MAPKK4; MEK4;	Ğ
	SERK1	_
MAPK kinase 6	MAPKK6; MEK6	G
MAPKK kinase	MAPKKK	G
Matrix Gla protein	MGP	G
Matrix metalloproteinase 1	MMP1	E
Matrix metalloproteinase 10	MMP10	E
Matrix metalloproteinase 11	MMP11	E
Matrix metalloproteinase 12	MMP12	E
Matrix metalloproteinase 13	MMP13	E
Matrix metalloproteinase 14	MMP14	E
Matrix metalloproteinase 15	MMP15	
Matrix metalloproteinase 16	MMP16	EEE
Matrix metalloproteinase 17	MMP17	E
Matrix metalloproteinase 18	MMP18	E
Matrix metalloproteinase 19	MMP19	E
Matrix metalloproteinase 2	MMP2	Ë
Matrix metalloproteinase 3	MMP3, STMY1	E
Matrix metalloproteinase 4	MMP4	E
Matrix metalloproteinase 5	MMP5	E
Matrix metalloproteinase 6	MMP6	Ē
Matrix metalloproteinase 7	MMP7	E
Matrix metalloproteinase 8	MMP8	E
Matrix metalloproteinase 9	MMP9	E
MAX-interacting protein 1	MXI1	Ğ
MEK kinase, MEKK		E
Melanocortin 1 receptor	MC1R	T
Melanocortin 2 receptor	MC2R	Ť
Melanocortin 4 receptor	MC4R	Ť
Menin	MEN1	Ġ
Mesoderm-specific transcript	MEST	Ğ
Methionine adenosyltransferase	MAT1A, MAT2A	Ē
Methionine synthase	MTR	Ē
Methionine synthase reductase	MTRR	Ē
Methylguanine-DNA methyltransferase	MGMT .	E
Methylmalonyl-CoA mutase	MUT A SECOND	Ē٠
Mevalonate kinase	MVK	Ē
MHC Class I: A		_
MHC Class I: B		i
MHC Class I: C		i
MHC Class I: LMP-2, LMP-7		i
MHC Class I: Tap1	ABCR, TAP1	i
MHC Class II: DP	HLA-DPB1	i
MHC Class II: DQ		i
MHC Class II: DR		i
MHC Class II: Tap2	TAP2, PSF2	i
•		

MHC Class II:Complementation group A	MHC2TA	1
MHC Class II:Complementation group B	rfxank	·i
MHC Class II:Complementation group C	RFX5	,
MHC Class II:Complementation group D	RFXAP	i
Microphthalmia-associated transcription factor	MITF	Ġ
Microsomal triglyceride transfer protein	MTP	T
Microtuble associated protein	MAP	S
Midline 1	MID1	
Mismatch repair gene, PMSL1	PMS1	G
Mismatch repair gene, PMSL2	PMS2	G
Mitochondrial trifunctional protein, alpha	HADHA	G E
subunit	HADHA	
Mitochondrial trifunctional protein, beta subunit	LIADUD	_
· · · · · · · · · · · · · · · · · · ·		E
Mitogen-activated protein (MAP) kinase	MAPK	G
Molybdenum cofactor synthesis 1	MOCS1	E
Molybdenum cofactor synthesis 2	MOCS2	E
Monoamine oxidase A	MAOA	E
Monoamine oxidase B	MAOB	Ε
Monocyte chemoattractant protein 1	MCP1	İ
Motilin	MLN	G
Msh homeobox homolog 1	MSX1	G
Msh homeobox homolog 2	MSX2	G
Mucolipidoses	GNPTA	Ε
Mulibrey nanism	MUL	T
Multidrug resistance associated protein	MRP	G
Muscarinic receptor, M1	CHRM1	Ν
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	Ν
Muscarinic receptor, M4	CHRM4	Ν
Muscarinic receptor, M5	CHRM5	Ν
Muscle phosphorylase	PYGM	Ε
Mutated in colorectal cancers, MCC	MCC	G
MutL homolog 1	MLH1	G
MutS homolog 2	MSH2	G
MutS homolog 3	MSH3	G
Myelin protein peripheral 22	PMP22	S
Myelin protein zero	MPZ	S
Myelodysplasia syndrome 1 gene	MDS1	G
Myeloid leukemia factor-1	MLF1	1
Myocilin	MYOC	Т
Myogenic factor 3	MYF3	G
Myogenic factor 4	MYF4	G
Myogenic factor 5	MYF5	G
Myomesin 1	MYOM1	S
	MYOM2	S S
	MYO15	Š
·	MYO6	S
•	MYO7A	S
•	· — - ·	0

Myosin, cardiac	MYH7	s
Myotubularin	MTM1	S
Na+, K+ ATPase, alpha	ATP1A1	Ğ
Na+, K+ ATPase, beta 1	ATP1B1	Ğ
Na+, K+ ATPase, beta 2	ATP1B2	Ğ
Na+, K+ ATPase, beta 3	ATP1B3	G
Na+/H+ exchanger 1	NHE1	T
Na+/H+ exchanger 2	NHE2	Ť
Na+/H+ exchanger 3	NHE3	Ť
Na+/H+ exchanger 4	NHE4	Ť
Na+/H+ exchanger 5	NHE5	Ť
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	Ē
N-acetylglucosamine-6-sulfatase	GNS	Ē
N-acetylglucosaminidase, alpha	NAGLU	Ē
N-acetyitransferase 1	NAT1	Ē
N-acetyltransferase 2	NAT2	Ē
NADH dehydrogenase		Ē
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS1	Ē
protein 1	•	_
NADH dehydrogenase (ubiquinone) Fe-S	NDUFS4	Ε
protein 4	•	_
NADH dehydrogenase (ubiquinone)	NDUFV1	Ε
flavoprotein 1		_
NADH-cytochrome b5 reductase	DIA1	Ε
NADPH-dependent cytochrome P450	POR	Ē
reductase		_
Natural resistance-associated macrophage	NRAMP1	ı
protein 1		
NB6		1
Necdin	NDN	G
Nephronophthisis 1	NPHP1	T
Nephronophthisis 2	NPHP2	Т
Nephrosis 1	NPHS1	T
Nerve growth factor	NGF	Ġ
Nerve growth factor receptor	NGFR	G
Neural retina-specific gene	NRL	G
Neuraminidase sialidase	NEU	Т
Neuregulin	HGL	G
Neurite growth-promoting factor 2	MDK	N
Neurite inhibitory protein		Ν
Neuroendocrine convertase 1	NEC1, PCSK1	Ε
Neurofibromin 1	NF1	G
Neurofibromin 2	NF2	G
Neurofilament protein, heavy	NFH	S
Neurofilament protein, NF125	NF150	Š
Neurofilament protein, NF200	NF200	S S
Neurofilament protein, NF68	NF68	Š
Neuronal apoptosis inhibitory protein	NAIP	ì

Neuronal molecule-1 Neuronal molecule-1 receptor Neuropeptide Y Neuropeptide Y receptor Y1 Neuropeptide Y receptor Y2 Neurotrophic tyrosine kinase receptor 1 Neurotrophin 3 Neurturin	NPY NPY1R NPY2R NTRK1 NTF3 or NT3 NRTN	
Neutral endopeptidase		·Ε
Neutrophil cystolic factor 1	NCF1	- 1
Neutrophil cystolic factor 2	NCF2	-
Niacin receptor		G
Nibrin	NBS1	G
Nitric oxide synthase 1, NOS1	NOS1	Ε
Nitric oxide synthase 2, NOS2	NOS2	Ε
Nitric oxide synthase 3, NOS3	NOS3	E
Nodal	NODAL	G
Noggin	NOG	G
Norrie disease protein	NDP	G
Notch 1	NOTCH1	G
Notch 2	NOTCH2	G
Notch 3	NOTCH3	G
Notch ligand - jagged 1	JAG1, AGS	G
Nuclear factor I-kappa-B-like gene	IKBL'	I
Nuclear factor kappa beta	NFKB	. 1
Nuclear factor of activated T cells (NFAT)	NFATC	G
complex, cytosolic		
Nuclear factor of activated T cells (NFAT)	NFATP	G
complex, preexisting component		
Nuclear mitotic apparatus protein 1	NUMA1	G
Nucleophosmin	NPM1	Т
Nucleoside diphosphate kinase-A	NDPKA	Ε
Ocular albinism 1	OA1	S
Oculocutaneous albinism II	OCA2	S
Oligophrenin-1	OPHN1	G
Oncogene abl1	ABL1	G
Oncogene abl2		G
Oncogene akt1	en en e	G
Oncogene akt2	AKT2	G
Oncogene axl	AXL	G
Oncogene bcl2		G
Oncogene bcr/abl	•	G
Oncogene B-lym		G
Oncogene B-raf		G
Oncogene clk1		G
Oncogene c-myc		G
Oncogene cot		G
Oncogene crk		G

Oncogene crkl		· G
Oncogene ect2		G
Oncogene ELK1	ELK1	G
Oncogene ELK2	ELK2	G
Oncogene ems1		G
Oncogene ERB		G
Oncogene ERB2		G
Oncogene ERBA		G
Oncogene ERBAL2		G
Oncogene ERG (early reponse gene)		· G
Oncogene ETS1		G
Oncogene ETS2		G
Oncogene EVI1	EVI1	G
Oncogene fes		G
Oncogene fgr	•	G
Oncogene fos	FOS	G
Oncogene fps		G
Oncogene GLI1	GLI	G
Oncogene GLI2	GLI2	G
Oncogene GLI3	GLI3	G
Oncogene gro1	•	G
Oncogene gro2		G
Oncogene Ha-ras	HRAS	G
Oncogene hs1		G
Oncogene hst	FGF4	G
Oncogene int1	WNT1	G
Oncogene int2	FGF3	G
Oncogene int3	Notch4	G
Oncogene int4	WNT3	G
Oncogene jun	JUN	G
Oncogene KIT Oncogene LCO	KIT, PBT	G
Oncogene I-myc	LCO	G
Oncogene Ipsa		G
		G
Oncogene lyn Oncogene maf		G
Oncogene mas1		G
Oncogene mcf2		G
Oncogene mdm2	MDM2	G
Oncogene mel	MDNZ	G
Oncogene met	MET	G
Oncogene mos	MET	G
Oncogene mpl		G
Oncogene MUM1	MUM1	G
Oncogene myb	MYB	G
Oncogene myc	MYC	G
Oncogene n-myc	IVITO	G
Oncogene N-ras (neuroblastoma v-ras)	NRAS	G G
	, 1417-10	G

Oncogene ovc		.G
Oncogene pim1		Ġ
Oncogene pti-1sea		Ğ
Oncogene pvt1		Ğ
Oncogene raf	RAF	Ğ
Oncogene ralb		Ğ
Oncogene rel		Ğ
Oncogene ret	RET	Ğ
Oncogene r-myc		G
Oncogene ros		G
Oncogene R-ras		G
Oncogene sis	PDGFB	G
Oncogene ski	. 5 3. 5	G
Oncogene sno		G
Oncogene spi1		G
Oncogene src		G
Oncogene tc21		G
Oncogene TEL	ETV6	G
Oncogene tim		G
Oncogene vavtrk		G
Oncogene v-Ki-ras2	KRAS2	G
Oncogene yes		G
Oncogene yuasa		G
Oncostatin M	OSM	G
Oncostatin M receptor	OSMR	G
Orexin	OX	G
Orexin 1 receptor	OX1R	G
Orexin 2 receptor	OX2R	G
Ornithine delta-aminotransferase	OAT	E
Ornithine transcarbamoylase	OTC, NME1	Ē
Orthodenticle (Drosophila) homolog 1	OTX1	G
Orthodenticle (Drosophila) homolog 2	OTX2	G
Osteocalcin	O I A L	S
Osteonectin	ON	G
Osteopontin	OPN	G
Osteoprotegerin	OPG	G
Otoferlin	OTOF	N
Oxytocin	OXT	N N
Oxytocin receptor	OXTR	, N
p21-activated kinase 3	PAK3	G
Paired box homeotic gene 1	PAX1	G
Paired box homeotic gene 2	PAX2	G
Paired box homeotic gene 3	PAX3	G
Paired box homeotic gene 6	PAX6	G
Paired box homeotic gene 7	PAX7	G
Paired box homeotic gene 8	PAX8	G
Paired-like homeodomain transcription factor 2		
Paired-like homeodomain transcription factor 3		G G
mo nomodomam danodipuon lactor d	, , , , , , ,	G

·		
Palmitoyl-protein thioesterase	PPT	Т
Pancreatic amylase		Ε
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	G
Parathyroid hormone related-peptide	PTHrP	G
Parathyroid hormone-like hormone	PTHLH	G
Parvalbumin	PVALB	Ğ
Patched (Drosophila) homolog, PTCH	PTCH	G
PCNA (proliferating cell nuclear antigen)		E
Peanut-like 1	PNUTL1	Ī
Pendrin, PDS	PDS	Ť
Peptidylglycine alpha-amidating	PAM	Ė
monooxygenase		_
Peripherin, PRPH .		s
Peroxisomal membrane protein 1	PXMP1	S
Peroxisomal membrane protein 3	PXMP3	T
Peroxisome biogenesis factor 1	PEX1	
Peroxisome biogenesis factor 19	PEX19	T
Peroxisome biogenesis factor 6	PEX6	T
Peroxisome biogenesis factor 7	PEX7	Ţ
Peroxisome proliferative activated receptor,	PPARA	Ţ
alpha	FFARA	T
Peroxisome proliferative activated receptor,	PPARG	Т
gamma		•
Peroxisome receptor 1	PXR1	Т
Phenylethanolamine N-methyltransferase,	PNMT	Ė
PNMT		_
Phosphatase & tensin homolog	PTEN	G
Phosphate regulating gene with homologies to	PHEX	G
endopeptidases on the X chromosome		
Phosphatidylinositol glycan, class A	PIGA	G
(paroxysmal nocturnal hemoglobinuria)		J
Phosphatidylinositol transfer protein	PITPN	G
Phosphodiesterase 1 / nucleotide	PDNP1	G
pyrophosphatase 1	. 2	0
Phosphodiesterase 1 / nucleotide	PDNP2	G
pyrophosphatase 2	. 5.41 2	G
Phosphodiesterase 1 / nucleotide	PDNP3	G.
pyrophosphatase 3	. 5111 0	G
Phosphofructokinase, liver	PFKL	_
Phosphofructokinase, muscle	PFKM	E
Phosphoglucose isomerase	GPI	E
Phosphoglycerate kinase 1	PGK1	E
Phosphoglycerate mutase 2	PGAM2	E
Phospholipase A2, group 10		E
Phospholipase A2, group 18	PLA2G10	1
El III III III	PLA2G1B	1
Phospholipase A2, group 2B	PLA2G2A	1
i nospholipase Az, gloup ZD	PLA2G2B	1

Phospholipase A2, group 4A Phospholipase A2, group 4C Phospholipase A2, group 5 Phospholipase A2, group 6 Phospholipase C alpha	PLA2G4A PLA2G4C PLA2G5 PLA2G6	
Phospholipase C beta Phospholipase C delta Phospholipase C epsilon	PLCD1	
Phospholipase C gamma	PLCG1 PMM1	
Phosphomannomutase 1 Phosphomannomutase 2	PMM2	G G
Phosphomannomutase-2	PMM2	T
Phosphorylase kinase deficiency, liver	PHK	Ē
Phosphorylase kinase, alpha 2	PHKA2	E
Phytanoyl-CoA hydroxylase	PHYH	G
Plakophilin 1	PKP1	T
Plasminogen	PLG	Ε
Plasminogen activator inhibitor 1	PAI1	Ε
Plasminogen activator inhibitor 2	PAI2	Ε
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	S
Plasminogen activator, Tissue	PLAT; TPA	Ε
Plasminogen activator, Urokinase	UPA; PLAU	E
Platelet derived growth factor	PDGF	G
Platelet derived growth factor receptor	PDGFR	G
Plectin 1	PLEC1	T
Poly (ADP-ribose) synthetase	PARS	E
Poly(A) binding protein 2	PABP2	G
Postsynaptic density-95 protein	PSD95	N
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1 KCNE1	N
Potassium voltage-gated channel E1	KCNQ1	N N
Potassium voltage-gated channel Q1	KCNQ1 KCNQ2	N
Potassium voltage-gated channel Q2	KCNQ3	N
Potassium voltage-gated channel Q3 Potassium voltage-gated channel Q4	KCNQ4	N
POU domain, class 1, transcription factor 1	POU1F1	G
(Pit1)		Ŭ
POU domain, class 3, transcription factor 4	POU3F4	G
POU domain, class 4, transcription factor 3	POU4F3	Ğ
Pre-B-cell leukemia transcription factor 1	PBX1	Ğ
Preproglucagon	GCG;GLP1; GLP2	G
Procollagen N-protease		
Procollagen peptidase		E
Profibrinolysin		G
Progesterone receptor (RU486 binding	PGR	G
receptor)		
Prohibitin	PHB	G

Prolactin	PRL	G
Prolactin receptor	PRLR	G
Prolactin releasing hormone	PRH	Ğ
Proliferin	PLF	Ğ
Proline dehydrogenase	PRODH	Ę
Pro-melanin-concentrating hormone	PMCH	Ğ
Promyelocytic leukemia gene	PML	G
Proopiomelanocortin	POMC	N
Prophet of Pit1	PROP1	G
Propionyl-CoA carboxylase, alpha	PCCA	E
Propionyl-CoA carboxylase, beta	PCCB	Ē
Prosaposin	PSAP	N
Prostaglandin (PG) D synthase, hematopoietic		E
Prostaglandin isomerase	. 333	Ġ
Prostaglandin-endoperoxidase synthase 2	PTGS2	G
Prostate cancer anti-metastasis gene KAI1	KAI1	G
Protease nexin 2	PN2	E
Protective protein for beta-galactosidase	PPGB	E
Protein C	PROC	-
Protein kinase A	1100	Ė
Protein kinase B	PRKB	
Protein kinase C, alpha	PRKCA	_
Protein kinase C, gamma	PRKCG	E
Protein kinase DNA-activated	PRKDC	E
Protein kinase G	TIMBO	E
Protein phosphatase 1, regulatory (inhibitor)	PPP1R3	E
subunit 3	111 1105	
Protein phosphatase 2, regulatory subunit A,	PPP2R1B	E
beta isoform	11121115	
Protein tyrosine phosphatase, non-receptor	PTPN12	G
type 12		G
Protoporphyrinogen oxidase	PPOX	Ε
Pterin-4-alpha-carbinolamine	PCBD	_
Purine nucleoside phosphorylase	NP	Ε
Purinergic receptor P1A1		N
Purinergic receptor P1A2		
Purinergic receptor P1A3		N
■ • • • • • • • • • • • • • • • • • • •	P2RX1 ····	N
–	P2RX2	· N
	P2RX3	N
	P2RX4	N
	P2RX5	N
	P2RX6	N
	P2RX7	N
	P2RY1	N
	P2RY11	N
5 1 1	P2RY2	N
<u> </u>	PYCS	N
y z.m.e e da. dokynato dynanotado	1 100	Ε

Pyruvate carboxylase	PC	Ε
Pyruvate decarboxylase	PDHA	Ε
Pyruvate kinase	PKLR	Ε
RAD51, DNA repair protein	RAD51	G
RAD52, DNA repair protein	RAD52	G
RAD54, DNA repair protein	RAD54	G
RAD55, DNA repair protein	RAD55	G
RAD57, DNA repair protein	RAD57	G
Ras-G-protein	RAS	Ğ
Rathke pouch homeobox, RPX	RPX	Ğ
Receptor tyrosine kinase (RTK), Nsk2	NSK2	Ğ
Recombination activating gene 1	RAG1	Ğ
Recombination activating gene 2	RAG2	Ğ
Red cone pigment	RCP	s
Relaxin H1	RLN1	G
Relaxin H2	RLN2	G
Replication factor A	INCINZ	E
•	RFC2	E
Replication factor C		
Retinal pigment epithelium specific protein	RPE65	S
(65kD)	504	_
Retinitis pigmentosa gene 1	RP1	S
Retinitis pigmentosa gene 2	RP2	S
Retinitis pigmentosa gene 3	RP3	S
Retinitis pigmentosa gene 6	RP6	S S
Retinitis pigmentosa gene 7	RP7, RDS	S
Retinoblastoma 1	RB1	G
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoid X receptor, alpha	RXRA	G
Retinoid X receptor, beta	RXRB	G
Retinoid X receptor, gamma	RXRG	G
Retinoschisis, X-linked, juvenile	RS	G
Rhabdoid tumors	SMARCB1	G
Rhodopsin	RHO	S
Ribonucleotide reductase, RRM		Ε
Ribosomal protein L13A	RPL13A	G
Ribosomal protein L17	RPL17	۰Ğ
Ribosomal protein S19	RPS19	Ε
Ribosomal protein S4, X-linked	RPS4X	Ē
Ribosomal protein S6 kinase	RPS6KA3	E
Ribosomal protein S9	RPS9	Ğ
RIGUI	RIGUI	G
Rod outer segment membrane protein 1	ROM1	S
Ryanodine receptor 1, skeletal	RYR1	G
SA homolog	SAH	G
Sal-like 1	SALL1	G
	SCT	T
Secretin	301	ı

Semaphorin A4	SEMA4	S
Semaphorin A5	SEMA5	S
Semaphorin D		S
Semaphorin E	SEMAE	S
Semaphorin F	SEMA3/F	S
Semaphorin W	SEMAW	s
Serine/threonine kinase 11	STK11	Ğ
Serine/threonine kinase 2	STK2	Ğ
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Serum amyloid A	SAA	Ť
Serum amyloid P	SAP	Ť
Sex determining region Y, SRY	SRY	Ġ
Short stature homeobox	SHOX	G
Sialoprotein, bone	BSP	G
Signal transducer and activator of transcription		G
1	017(11	•
Signal transducer and activator of transcription	STAT2	G
2	017112	•
Signal transducer and activator of transcription	STAT3	G
3	317113	•
Signal transducer and activator of transcription	STAT4	G
4		
Signal transducer and activator of transcription	STAT5	G
5	.,	
Signaling lymphocyte activation molecule	SLAM	1
Sine oculis homeobox, drosophila, homolog 1	SIX1	Ġ
Sine oculis homeobox, drosophila, homolog 2	SIX2	Ğ
Sine oculis homeobox, drosophila, homolog 5	SIX5	Ğ
Sjoegren (Sjogren) syndrome antigen A1	SSA1	Ĭ
Slug protein	88711	Ġ
Small nuclear ribonucleoprotein polypeptide N	SNRPN	S
Smoothelin	SMTN	G
Smoothened (Drosophila) homolog	SMOH	G
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Soutum chaitner, non-voltage gated 1, alpha	JUN 171	. 4

Sodium channel, non-voltage gated 1, beta	SCNN1B	Ν
Sodium channel, non-voltage gated 1, gamma	SCNN1G	N
Sodium channel, voltage gated, type IV, alpha	SCN4A	N
polypeptide		••
Sodium channel, voltage gated, type V, alpha	SCN5A	N
polypeptide		
Sodium channel, voltage-gated, type 1, beta	SCN1B	N
polypeptide		
Solute carrier family 1 (amino acid transporter),	SLC1A6	Т
member 6	<u> </u>	
Solute carrier family 1 (glial high affinity	SLC1A3	Т
glutamate transporter), member 3	•	
Solute carrier family 1 (glutamate transporter),	SLC1A1	Т
member 1		
Solute carrier family 1 (glutamate transporter),	SLC1A2	Т
member 2		
Solute carrier family 1 (neutral amino acid	SLC1A4	T
transporter), member 4		
Solute carrier family 10 (sodium/bile acid	SLC10A1	Τ
cotransporter family),member 1		
Solute carrier family 10 (sodium/bile acid	SLC10A2	T
cotransporter family),member 2		
Solute carrier family 12, member 1	SLC12A1	T
Solute carrier family 12, member 2	SLC12A2	T
Solute carrier family 12, member 3	SLC12A3	Т
Solute carrier family 14, member 2	SLC14A2	T
Solute carrier family 15 (H+/peptide	SLC15A1	Τ.
transporter, intestinal), member 1	01.04540	
Solute carrier family 15 (H+/peptide	SLC15A2	T
transporter, kidney), member 2	C1 C4CA4	_
Solute carrier family 16 (monocarboxylate	SLC16A1	Ŧ
transporter), member 1	SI C4647	~
Solute carrier family 16 (monocarboxylate	SLC16A7	T
transporter), member 7	SI C1741	_
Solute carrier family 17, member 1	SLC17A1 SLC17A2	T
Solute carrier family 17, member 2	SLC18A3	T
Solute carrier family 18, member 3	SLC19A1	T T
Solute carrier family 19 (folate transporter),	SECIANI	Lo a
member 1 Solute carrier family 2 (facilitated glucose	SLC2A1	Т
transporter), member 1	SECZAT	'
Solute carrier family 2 (facilitated glucose	SLC2A2	Т
transporter), member 2	OCOZ/YZ	•
Solute carrier family 2 (facilitated glucose	SLC2A3	Т
transporter), member 3		•
Solute carrier family 2 (facilitated glucose	SLC2A4	Т
transporter), member 4		'
Solute carrier family 2 (facilitated glucose	SLC2A5	Т
Column 2 (lacing gradede		•

transporter), member 5		
Solute carrier family 20, member 1	SLC20A1	Т
Solute carrier family 20, member 2	SLC20A2	Ť
Solute carrier family 20, member 3	SLC20A3	Ť
Solute carrier family 21, member 2	SLC21A2	Ť
Solute carrier family 21, member 3	SLC21A3	Ť
Solute carrier family 22, member 1	SLC22A1	Ť
Solute carrier family 22, member 2	SLC22A1	T
Solute carrier family 22, member 5	SLC22A2 SLC22A5	Ť
Solute carrier family 25, member 3	SLC25A12	Ť
Solute carrier family 25, member 12 Solute carrier family 3 (facilitated glucose	SLC3A1	
transporter), member 1	GLOSAT	Т
Solute carrier family 4 (anion exchanger),	SLC4A1	~
member 1	SLC4A1	T
Solute carrier family 4 (anion exchanger),	SLC4A2	Т
member 2	SLO4AZ	i
Solute carrier family 4 (anion exchanger),	SLC4A3	~
member 3	SLO4A3	T
Solute carrier family 5 (sodium/glucose	SLC5A1	Т
transporter), member 1	SEOSAT	'
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2	OLOGAZ .	•
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5	0200.10	•
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	Ť
AMINOBUTYRIC ACID transporter), member 1		•
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		•
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		
Solute carrier family 6, member 10	SLC6A10	Т
Solute carrier family 6, member 6	SLC6A6	Т
Solute carrier family 6, member 8	SLC6A8	T
Solute carrier family 7(amino acid transporter),		Т
member 1		
Solute carrier family 7(amino acid transporter),	SLC7A2	Т
member 2		
Solute carrier family 7(amino acid transporter),	SLC7A7	Т
member 7		
Solute carrier family 8 (sodium/calcium	SLC8A1	T
exchanger), member 1		
Somatostatin receptor, SSTR2	SSTR2	G
Somatotrophin		G
Sonic hedgehog, SHH	SHH	G
Sorbitol dehydrogenase	SORD	Ε

Sorcin SOS1 guanine nucleotide exchange factor Spastic paraplegia 7 Spectrin alpha Spectrin beta Sperm adhesion molecule Sperm protamine P1 Sperm protamine P2 Sphingomyelinase Spinocerebellar ataxia 8 gene Split hand/foot malformation gene SRY-box 10 SRY-box 11 SRY-box 3 SRY-box 4 SRY-box 9 Stem cell factor Steroid 5 alpha reductase 1 Steroid 5 alpha reductase 2 Steroid hormone receptor responsive DNA elements	SRI SOS1 SPG7 SPTA1 SPTB SPAM1 PRM1 PRM2 SMPD1 SCA8 DSS1 SOX10 SOX10 SOX11 SOX3 SOX4 SOX9 SCF SRD5A1 SRD5A2	$ \verb TGGSSGGGEZGGGGGGGEEG \\$
Steroid sulphatase	STS	Ε
Steroidogenic acute regulatory protein	STAR	T
Stromal derived factor 1	SDF1	G
Succinate dehydrogenase 1	SDH1	Ε
Succinate dehydrogenase 2	SDH2	Ε
Succinate thiokinase		Ε
Succinic semi-aldehyde dehydrogenase	ssadh	E
Sulfamidase	SGSH	G
Sulfite oxidase	SUOX	E
Sulfonylurea receptor	SUR	G
Suppression of tumorigenicity 3 gene	ST3	G
Suppression of tumorigenicity 8 gene	ST8	G
Surfactant pulmonary-associated protein A1	SFTPA1	Т
Surfactant pulmonary-associated protein A2	SFTPA2	T
Surfactant pulmonary-associated protein B	SFTPB	Т
Surfactant pulmonary-associated protein C	SFTPC	Т
Surfactant pulmonary-associated protein D.	SFTPD A PART OF THE STATE OF	\mathbf{T}
Surfeit 1	SURF1	G
Survival of motor neuron 1, telomeric	SMN1	Т
SYK-related tyrosine kinase	SRK	l
Syndecan 1	SYND1	G
Syndecan 2	SYND2	G
Syndecan 3	SYND3	G
Syndecan 4	SYND4	G
Synovial sarcoma gene 1	SSX1	G
Synovial sarcoma gene 2	SSX2	G
Talin	TLN	G

TATA binding protein TATA binding protein associated factor 2A	TBP TAF2A			G G
TATA binding protein associated factor 2C2	TAF2C2			G
TATA binding protein associated factor 2D	TAF2E			G
TATA binding protein associated factor 2F	TAF2F			G
TATA binding protein associated factor 2H	TAF2H			G
TATA binding protein associated factor 2I	TAF21			G
TATA binding protein associated factor 2J	TAF2J			G
TATA binding protein associated factor 2K	TAF2K			G
Tau protein	MAPT			S
T-BOX 1	TBX1			G
T-BOX 2	TBX2			G
T-BOX 3	TBX3			G
T-BOX 4	TBX4			G
T-BOX 5	TBX5			G
T-BOX 6	TBX6			G
T-cell acute lymphocytic leukemia 1	TAL1			1
T-cell acute lymphocytic leukemia 2	TAL2			;
T-cell receptor, alpha	TCRA	*	•	;
T-cell receptor, delta	TCRD	•		•
Telomerase protein component				Ė
Tenascin (cytotactin)				S
Tenascin XA	TNXA			S
Terminal deoxynucleotidyltransferase, TDT				S E
Testis-specific protein Y	TSPY			G
Thiolase, perioxisomal				Ē
Thiopurine S-methyltransferase	TPMT			E
Thrombopoietin	THPO			G
Thrombospondin	THBS1			G
Thromboxane A synthase 1	TBXAS1			ı
Thromboxane A2	TXA2			i
Thromboxane A2 receptor	TBXA2R			1
Thy-1 T-cell antigen	THY1			ì
Thymidylate synthase	TYMS			Ė
Thymopoietin	TMPO			Ğ
Thyroglobulin	TG			Ğ
Thyroid hormone receptor, alpha	THRA			G
Thyroid hormone receptor, beta	THRB			Ğ
Thyroid peroxidase	TPO	·	•	G
Thyroid receptor auxiliary protein	TRAP			G
Thyroid-stimulating hormone receptor	TSHR			G
Thyroid-stimulating hormone, alpha	TSHA			G
Thyroid-stimulating hormone, beta	TSHB			G
Thyrotroph embryonic factor	TEF			G
Thyrotropin releasing hormone	TRH			G
Thyrotropin releasing hormone receptor	TRHR			G
Thyroxin-binding globulin	TBG			T
TIE receptor tyrosine kinase	TIE-1			Ğ
		-		3

Tip-associated protein Tissue inhibitor of metalloproteinase 1, TIMP1 Tissue inhibitor of metalloproteinase 2, TIMP2 Tissue inhibitor of metalloproteinase 3, TIMP3 Tissue inhibitor of metalloproteinase 4, TIMP4 Tissue non-specific alkaline phosphatase TNSAP	TAP TIMP1 TIMP2 TIMP3 TIMP4	
Titin Tocopherol (alpha) transfer protein Toll-like receptor 4 Topoisomerase I Topoisomerase II Torticollis, keloids, cryptorchidism and renal	TTN TTPA TLR4 TKCR	S T I E E G
dysplasia gene Transacylase Transcobalamin 1, TCN1 Transcobalamin 2, TCN2 Transcription factor 1, hepatic Transcription factor 2, hepatic Transcription factor 3 Transcription factor binding to IGHM enhancer 3	TCN2 TCF1 TCF2 TCF3 TFE3	E T T G G G G
Transcription factor, TUPLE1 Transcription termination factor, RNA polymerase 1	TUPLE1 TTF1	N G
Transcription termination factor, RNA polymerase 2	TTF2	G
Transcription termination factor, RNA polymerase 3	TTF3	G
Transferrin	TF	G
Transferrin receptor	TFRC	G
Transforming growth factor, alpha	TGFA	Ğ
Transforming growth factor, beta 2	TGFB2	G
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G
Transglutaminase 1	TGM1	G
Transglutaminase 2	TGM2	G
Transglutaminase 4	TGM4 ,	G
Transketolase	TKT	E
Transketolase-like 1	TKTL1	Ε
Translocation in renal carcinoma on chromosome 8 gene	TRC8	G
Transthyretin	TTR	T
Treacle gene	TCOF1	G
Triosephosphate isomerase	TPI1	E
Tropomyosin 1 alpha	TPM1	S
Tropomyosin 3 (non-muscle) Troponin C	TPM3	S S

- , ,		
Troponin I	TNNI3	S
Troponin T2, cardiac	TNNŢ2	S
Trypsin inhibitor		Ε
Trypsinogen 1	TRY1	E
Trypsinogen 2	TRY2	E
Tryptophan hydroxylase	TPH	Ē
Tubby-like protein 1	TULP1	Ğ
Tuberous sclerosis 1	TSC1	G
Tuberous scierosis 2	TSC2	Ğ
Tubulin		S
Tumor susceptibility gene 101	TSG101	G
Tumour necrosis factor (TNF) receptor	TRAF1	ı
associated factor 1		•
Tumour necrosis factor (TNF) receptor	TRAF2	1
associated factor 2	110 ti E .	'
Tumour necrosis factor (TNF) receptor	TRAF3	1
associated factor 3	TICALO	,
Tumour necrosis factor (TNF) receptor	TRAF4	
associated factor 4		1
Tumour necrosis factor (TNF) receptor	TRAF5	
associated factor 5	IIIAI J	ı
Tumour necrosis factor (TNF) receptor	TRAF6	
associated factor 6	INAFO	ı
Tumour necrosis factor alpha	TNFA	
Tumour necrosis factor alpha receptor		!
Tumour necrosis factor beta	TNFAR	!
	TNFB	I .
Tumour necrosis factor beta receptor	TNFBR	<u> </u>
Tumour protein p53	TP53, P53	G
Tumour protein p63	TP63	G
Tumour protein p73	TP73	G
Tumour protein, translationally-controlled 1	TPT1	G
Tumour suppressor gene DRA	DRA	1
Twist (Drosophila) homolog	TWIST	G
Tyrosinase	TYR	Ε
Tyrosinase-related protein 1	TYRP1	Ε
Tyrosine aminotransferase	TAT	Ε
Tyrosine hydroxylase	TH	E
Ubiquitin		· G
Ubiquitin activating enzyme, E1		E
Ubiquitin B	UBB	G
Ubiquitin C	UBC	G -
Ubiquitin carboxyl-terminal esterase L1	UCHL1	G
Ubiquitin fusion degeneration 1-like	UFD1L	G
Ubiquitin protein ligase E3A	UBE3A	·E
UDP-glucose pyrophosphorylase		E
UDP-glucuronosyltransferase 1	ugt1d, UGT1	E E
UDP-glucuronosyltransferase 2	UGT2	Ē
Uncoupling protein 1		Ī

Uncoupling protein 3 Undulin 1 Uridine monophosphate kinase Uridine monophosphate synthetase Uridinediphosphate(UDP)-galactose-4- epimerase	UCP3 COL14A1 UMPK UMPS GALE	T S ! E
Uroporphyrinogen decarboxylase Uroporphyrinogen III synthase Usher syndrome 2A Vascular endothelial growth factor Vasoinhibitory peptide Vitamin B12-binding (R) protein Vitamin D receptor	UROD UROS USH2A VEGF	EESGGGG
Vitelliform macular dystrophy, atypical gene v-myc avian myelocytomatosis viral oncogene homolog	VMD1 MYC	T G
Von Hippel-Lindau gene Werner syndrome helicase Wilms tumour gene 1 Wilms tumour gene 2 Wilms tumour gene 4 Winged helix nude Wingless family, wnt2 Wingless family, wnt5 Wingless family, wnt5 Wingless family, wnt7 Wingless family, wnt8 Wiskott-Aldrich syndrome protein Wnt inhibitory factor, WIF-1 Wolf-Hirschhorn syndrome candidate 1 gene Wolfram syndrome 1 gene X (inactive)-specific transcript Xanthine dehydrogenase Xeroderma pigmentosum, complementation group A	VHL WRN WT1 WT2 WT4 WHN WNT2 WNT4 WNT5 WNT7 WNT8 WASP, THC WIF1 WHSC1 WFS1 XIST XDH XPA	GGGGGGGGGGG-GG8GEE
Xeroderma pigmentosum, complementation	XPB	E
group B Xeroderma pigmentosum, complementation group C Xeroderma pigmentosum, complementation	XPC	E E
group D Xeroderma pigmentosum, complementation		Ε
group E Xeroderma pigmentosum, complementation group F	XPF .	Ε
Xeroderma pigmentosum, complementation group G	ERCC5	Ε
X-ray repair gene	XRCC9	G

Xylitol dehydrogenase		Ε
YY1 transcription factor	YY1	Ğ
Zinc finger protein 198	ZIC198	S
Zinc finger protein 2	ZIC2	S
Zinc finger protein 3	ZIC3	S
Zinc finger protein HRX	ALL1	J
Zona pellucida glycoprotein 1	ZP1	Ġ
Zona pellucida glycoprotein 2	ZP2	G
Zona pellucida glycoprotein 3	ZP3	G
Zona pellucida receptor tyrosine kinase	ZRK	G
Zonadhesin	ZAN	G

- 386.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 385.
- 387.A set according to claim 385 or 386 in which a minority of said probes for listed genes are absent.
- 388.A set according to claim 385 or 386 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 389.A set according to claim 385 or 386 in which a limited number of probes are replaced by probes for non-listed genes.
- 390.A set of probes for a core group of genes according to any of claims 385 to 389 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 391.A set according to any of claims 385 to 390 consisting of probes for members of a sub-group of the core group.
- 392.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 393. A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 394.A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 395.A set according to claim 392 or 393 in which said substrate is a semiconductor microchip.
- 396.A set according to any preceding claim for use in a biological assay for detection of said gene variants.

- 397. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 398. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 399. A medical device including a set according to any of claims 385 to 397 for use in an array for detection of differential gene expression levels.
- 400. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 385) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 385 and 387 to 397 and relating the probe hybridisation pattern to said variations.
- 401. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 386) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 386 to 397 and relating the probe interaction pattern to said variations.
- 402. Use of a set or device according to any of claims 385 to 397 for the prognosis and management of patients suffering from or at risk of dysfunction, damage or disease consequent on an aberration in the processes of development or of experiencing the symptoms and consequences of dysfunction, damage or disease of the body consequent to an aberration in the processes of development.
- 403. Use of a set or device according to any of claims 385 to 397 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 404. Use of a set or device according to any of claims 385 to 397 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 405. Use of a set or device according to any of claims 385 to 397 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 406. Use of a set or device according to any of claims 385 to 397 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 407. Use of a set or device according to any of claims 385 to 397 for the development of new strategies of therapeutic intervention and in clinical trials.
- 408. Use of a set or device according to any of claims 385 to 397 for construction of and generation of algorithms for patient and healthcare management.
- 409. Use of a set or device according to any of claims 385 to 397 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 410. Use of a set or device according to any of claims 385 to 397 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 411. Use of a set or device according to any of claims 385 to 397 for predicting optimum configuration/management of thereapeutic intervention.

- 412.A method according to claim 400 or 401 in which the identification of gene variants is indicative of a higher risk of developing the symptoms and consequences of dysfunction, damage or disease of the body consequent to an aberration in the processes of development for the patient or individual.
- 413. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop the symptoms and consequences of dysfunction, damage or disease of the body consequent to an aberration in the processes of development, which method comprises:
- i) obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from dysfunction, damage or disease of the body consequent to an aberration in the processes of development;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the dysfunction, damage or disease of the body consequent to an aberration in the processes of development;
- iii) analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 385 to 391;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing dysfunction, damage or disease of the body consequent to an aberration in the processes of development.
- 414. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 413.
- 415. A method according to any of claims 400, 401, 413 and 414 wherein at least one step is computer-controlled.
- 416. An assay suitable for use in a method according to any of claims 400, 401, 413 and 414; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 385 to 491 in a biological sample.
- 417. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing dysfunction, damage or disease of the body consequent to an aberration in the processes of development; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 385 or 387 to 391 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - readout indicating the probability of a patient or individual developing dysfunction, damage or disease of the body consequent to an aberration in the processes of development.
- 418. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing symptoms; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 386 to 391 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process

- readout indicating the probability of a patient or individual developing dysfunction, damage or disease of the body consequent to an aberration in the processes of development.
- 419. A set of probes according to claim 385, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 420.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to dysfunction, damage or disease of the skin, muscle, connective tissue or bone; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

SKIN, BONE, MUSCLE GENE LIST	HUGO gene symbol	Protein function
17beta hydroxysteroid oxidoreductase		E
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	E
6-phosphofructo-2-kinase	PFKFB1	Ε
Acetoacetyl 2-CoA-thiolase	ACAT2	Ε
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	N
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	N
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	N
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	N
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	N
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	. N.,
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	· N
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	N
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	N
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	N
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	N
Acetylcholine receptor, nicotinic, epsilon	CHRNE	N
Acetylcholine receptor, nicotinic, gamma	CHRNG	N
Acetylcholinesterase	ACHE	Ε
Achromatopsia 2	ACHM2	S
Acid phosphatase 2, lysosomal	ACP2	E

Actin, alpha, cardiac	ACTC		S
Actin, alpha, skeletal	ACTA1		S
Actin, alpha, smooth, aortic	ACTA2		S
Actin, beta	ACTB		S
Actin, gamma 2	ACTG2		S
Activin			G
Acyl CoA dehydrogenase, short chain	ACADS		E
Acyl-CoA thioesterase			Ē
Adaptin, beta 3A	ADTB3A		Ŧ
Adducin, alpha	ADD1	•	S
Adducin, beta	ADD2		Š
Adenosine deaminase	ADA	•	Ē
Adenosine monophosphate deaminase	AMPD		Ē
Adenosine receptor A1	ADORA1		N
Adenosine receptor A2A	ADORA2A		N
Adenosine receptor A2B	ADORA2B		N
Adenosine receptor A3	ADORA3		N
Adenyl cyclase	•		N
Adenylate cyclase 1	ADCY1		E
Adenylate cyclase 2	ADCY2		Ε
Adenylate cyclase 3	ADCY3	•	Ε
Adenylate cyclase 4	ADCY4		Ε
Adenylate cyclase 5	ADCY5		Ε
Adenylate cyclase 6	ADCY6		E
Adenylate cyclase 7	ADCY7		Ε
Adenylate cyclase 8	ADCY8		Ε
Adenylate cyclase 9	ADCY9		E
Adenylate kinase	AK1		Ε
Adenylosuccinate lyase	ADSL		Ε
Adrenergic receptor, alpha1	ADRA1		Ν
Adrenergic receptor, alpha2	ADRA2		Ν
Adrenagic receptor, beta1	ADRB1		Ν
Adrenagic receptor, beta2	ADRB2		Ν
Adrena entire tendricular de la companya del companya de la companya de la companya del companya de la companya	ADRB3		Ν
Adrenocorticotrophic hormone (ACTH)	ACTHR		G
receptor		·	
Adrenoleukodystrophy gene	ALD	•	Ε
Alanine aminotransferase		* 41 ***	· T ·
Alanine-glyoxylate aminotransferase Albumin, ALB	AGXT		. Е
	ALB		T
Alcohol dehydrogenase 1	ADH1		Ε
Alcohol dehydrogenase 2	ADH2		Ε
Alcohol dehydrogenase 3 Alcohol dehydrogenase 4	ADH3		Ε
Alcohol dehydrogenase 5	ADH4		Ε
Alcohol denydrogenase 5 Alcohol dehydrogenase 6	ADH5		Ε
Alcohol derlydrogenase 6 Alcohol dehydrogenase 7	ADH6		E
Aldehyde dehydrogenase 1	ADH7		E
addityde denydlogenase i	ALDH1		Ε

Aldehyde dehydrogenase 10	ALDH10	
Aldehyde dehydrogenase 2	ALDH2	
Aldehyde dehydrogenase 5	ALDH5	
Aldehyde dehydrogenase 6	ALDH6	
Aldehyde dehydrogenase 7	ALDH7	E
Aldolase A	ALDOA	E
Aldolase B	ALDOB	E
Aldolase C	ALDOC	E
Aldosterone receptor	MLR	Ċ
Alkaline phosphatase, liver/bone/kidney	ALPL	, ר
Alkaptonuria gene	AKU	Ċ
Alkylglycerone phosphate synthase	AGPS	E
alpha tectorin	TECTA	9
alpha thalassemia gene	ATRX	, N
alpha1-antichymotrypsin	AACT	
alpha1-antitrypsin	PI	E E
alpha2-antiplasmin	PL!	E
alpha-actinin 2	ACTN2	G
alpha-actinin 3	ACTN3	Ġ
alpha-Galactosidase A	GLA	E
Alpha-galactosidase B, GALB	NAGA	E
alpha-synuclein	SNCA	N
Amelogenin	AMELX	S
Aminopeptidase P	XPNPEP2	E
Amphiregulin	AREG	G
Amylo-1,6-glucosidase	AGL	Е
Amyloid beta A4 precursor protein	APP	N
Amyloid beta A4 precursor-like protein	APLP	N
Androgen binding protein	ABP	Т
Androgen receptor	AR	G
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	E
Angiotensinogen	AGT	Ε
Antidiuretic hormone receptor	ADHR	Т
Anti-Mullerian hormone	AMH	G
Apolipoprotein A 4	APOA4	T
Apolipoprotein A I	APOA1	·· · T
Apolipoprotein A II	APOA2	T
Apolipoprotein B	APOB	Т
Apolipoprotein C1	APOC1	Т
Apolipoprotein C2	APOC2	Т
Apolipoprotein C3	APOC3	Т
Apolipoprotein D	APOD	T
Apolipoprotein E	APOE	Т
Apolipoprotein H	APOH	Т
Arginine vasopressin	AVP	Ν
Arginine vasopressin receptor 1A	AVPR1A	N

Arginine vasopressin receptor 1B	AVPR1B	N
Arginine vasopressin receptor 2	AVPR2	N
Arrestin	SAG	S
Aryl hydrocarbon receptor nuclear	ARNT	T
translocator	AINI	ı
Arylsulfatase A	ARSA	_
Arylsulfatase B		E
Arylsulfatase C	ARSB	E
•	ARSC1	E
Arylsulfatase D	ARSD	E
Arylsulfatase E	ARSE	Ε
Arylsulfatase F	ARSF	Ε
Aspartate receptor		Ν
Aspartoacylase	ASPA	Ε
Aspartylglucosaminidase	AGA	Ε
Ataxia telangiectasia complementation group	ATD, ATDC	G
D		
Ataxia telangiectasia gene, AT	ATM	G
ATP cobalamin adenoxyltransferase		E
ATP sulphurylase	atpsk2	Ε
ATP/ADP translocase		Ε
Attractin		1
Autoimmune regulator, AIRE	AIRE	1
BCL2-related protein A1	BCL2A1	G
Benzodiazepine receptor		Ν
Bestrophin	VMD2	Т
beta 2 microglobulin	B2M	İ
beta-endorphin receptor		Ň
beta-galactosidase	GLB1	E
beta-Glucuronidase	GUSB	E
beta-synuclein	SNCB	N
Bilirubin UDP-glucuronosyltransferase		E
Bloom syndrome protein	BLM	Ğ
Blue cone pigment	BCP	s
Bone morphogenetic protein, BMP1	BMP1	G
Bone morphogenetic protein, BMP2	BMP2	_
Bone morphogenetic protein, BMP3	BMP3	G
Bone morphogenetic protein, BMP4	BMP4	G
Bone morphogenetic protein, BMP5	BMP5	G
•		G
Bone morphogenetic protein, BMP6	BMP6	G
Bone morphogenetic protein, BMP7	BMP7	G
Bone morphogenetic protein, BMP8	BMP8	G
Bradykinin receptor B1		ı
Bradykinin receptor B2		İ
Branched chain aminotransferase 1, cytosolic		Ε
Branched chain aminotransferase 2,	BCAT2	Ε
mitochondrial		
Breast cancer, ductal, 1	BRCD1	G
Breast cancer, ductal, 2	BRCD2	G
•		

Ruturulahalinastarasa	BCHE		_
Butyrylcholinesterase			E
Ca(2+) transporting ATPase, fast twitch Ca(2+) transporting ATPase, slow twitch	ATP2A1 ATP2A2		T
, , , , , , , , , , , , , , , , , , ,	· -		T
Cadherin E	CDH1		G
Cadherin EP	00110		G
Cadherin N	CDH2		G
Cadherin P	CDH3		G
Calbindin 1	CALB1		G
Calbindin D9K	CALB3		G
Calcitonin receptor /Calcitonin gene-related	CALCR		Ν
peptide receptor			
Calcitonin/Calcitonin gene-related peptide	CALCA		.N
alpha			
Calcium channel, voltage-dependent, L type,	CACNA1S		Ν
alpha 1S subunit			
Calcium channel, voltage-dependent, P/Q	CACNA1A		Ν
type, alpha 1A subunit			• •
Calmodulin 1	CALM1		G
Calmodulin 2	CALM2		G
Calmodulin 3	CALM3		Ğ
Calnexin	CANX		G
Calpain	CAPN, CAPN3		E
Cannabinoid receptor	CNR1		N
Carbonic anhydrase 3	CA3		E
Carbonic anhydrase 4	CA4		E
Carbonic anhydrase, alpha	CA1		E
Carbonic anhydrase, beta	CA2		E
Carnitine acetyltransferase	CRAT		E
Carnitine acylcarnitine translocase	CACT		
Carnitine adylcarnitine translocase Carnitine palmitoyltransferase I	CPT1A		E E
Carnitine palmitoyltransferase II	CPT2		Ξ.
Carnitine transporter protein			E
	CDSP, SCD		T
Cartilage oligomeric matrix protein	COMP, EDM1,		Ν
Cartilaga haishwaanlasia sana	PSACH		
Cartilage-hair hypoplasia gene	CHH		N
Catenin, beta	CTNNB1		G
Cathepsin K	CTSK		Ε
Caveolin 3	CAV3	711	Ε
CD1	CD1		ı
CD4	CD4		1
Ceroid lipofuscinosis neuronal 3	CLN3		Ν
Ceruloplasmin precursor	CP		E
Chemokine MCAF	MCAF		1
Chloride channel 1, skeletal muscle	CLCN1		S
Cholecystokinin	CCK		Ν
Cholecystokinin B receptor	CCKBR		Ν
Cholesterol ester hydroxylase	•		Ε
Choline acetyltransferase	CHAT		Ε

Choroideremia gene	СНМ	s
Citrate synthase		Ē
Clathrin		T
Cleft palate gene	CPX	Ğ
Cockayne syndrome gene, CKN1	CKN1	Ğ
Coenzyme Q (CoQ)/ubiquinone	•	Ē
Collagen i alpha 1	COL1A1	s
Collagen I alpha 2	COL1A2	S
Collagen II alpha 1	COL2A1	S
Collagen III alpha 1	COL3A1	S
Collagen IV alpha 1	COL4A1	S
Collagen IV alpha 2	COL4A2	S
Collagen IV alpha 3	COL4A3	S
Collagen IV alpha 4	COL4A4	S
Collagen IV alpha 5	COL4A5	S S
Collagen IV alpha 6	COL4A6	S
Collagen IX alpha 2	COL9A2, EDM2	S
Collagen IX alpha 3	COL9A3	S
Collagen receptor	COLR	S
Collagen V alpha 1	COL5A1	S
Collagen V alpha 2	COL5A2	S
Collagen VI alpha 1	COL6A1	S
Collagen VI alpha 2	COL6A2	S
Collagen VI alpha 3	COL6A3	S
Collagen VII alpha 1	COL7A1	S
Collagen X alpha 1	COL10A1	S
Collagen X alpha 1	COL11A1	S
Collagen XI alpha 2	COL11A2	S
Collagen XVII alpha 1	COL17A1	S
Collagenic-like tail subunit of asymmetric	COLQ	E
acetylcholinesterase		
Collapsin		G
Colony-stimulating factor 1	CSF1	G
Colony-stimulating factor 1 receptor	CSF1R	G
Colony-stimulating factor 2	CSF2	G
Colony-stimulating factor 2 alpha receptor	CSF2RA	G
Colony-stimulating factor 2 beta receptor	CSF2RB	G
Colony-stimulating factor 3	- CSF3	. G
Colony-stimulating factor 3 receptor	CSF3R	G
Complement component C1 inhibitor	C1NH	1
Complement component C1qa	C1QA	1
Complement component C1qb	C1QB	1
Complement component C1qg	C1QG	ı
Complement component C1r	C1R	1
Complement component C1s	C1S	1
Complement component C2	C2	f
Complement component C3	C3	1
Complement component C4A	C4A	1

•		
Complement component C4B	C4B	,
Complement component C5	C5	
Complement component C6	C6	i
Complement component C7	C7	i
Complement component C8	C8B	i
Complement component C9	C9	i
Complement component receptor 1	CR1	i
Complement component receptor 2	CR2	1
Complement component receptor 3	CR3	1
Complex I	3113	Ė
Complex II		E
Complex III		E
Complex III		E
Complex V	MTATP6	E
Cone-rod homeobox-containing gene	CRX	G
Coproporphyrinogen oxidase	CPO	E
Core-binding factor, alpha 1	CBFA1	G
Core-binding factor, alpha 2	CBFA2	
Core-binding factor, beta	CBFB	G
Corticosteroid binding globulin	CBG	G
Cortico-steroid binding protein	CBG	N
Corticotrophin-releasing hormone	CRH	T
Corticotrophin-releasing hormone receptor	CRHR1	T
Cortisol receptor	CKIKI	T
C-reactive protein CRP		1
Creatine kinase – B and m	CKBE	ļ.
Creb binding protein	CREBBP	E G
Crystallin, alpha A	CRYAA	
Crystallin, alpha B	CRYAB	S S
Crystallin, beta B2	CRYBB2	S
Crystallin, gamma A	CRYGA	S S
c-src tyrosine kinase	CSK .	S G
Cu2+ transporting ATPase alpha polypeptide		E
Cu2+ transporting ATPase beta polypeptide	ATP7B	E
Cyclic AMP response element binding protein		_
Cyclic AMP-dependent protein kinase	PKA	G
Cyclic nucleotide phosphodiesterase 1B	PDE1B	E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	E .
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	
Cyclic nucleotide phosphodiesterase 3A Cyclic nucleotide phosphodiesterase 3B	PDE3B	E
Cyclic nucleotide phosphodiesterase 4A	PDE4A	
Cyclic nucleotide phosphodiesterase 4C	PDE4C	E
Cyclic nucleotide phosphodiesterase 5A	PDE5A	E
Cyclic nucleotide phosphodiesterase 6A	PDE6A	E
Cyclic nucleotide phosphodiesterase 6B	PDE6B	Ε
		E
Cyclic nucleotide phosphodiesterase 8	PDE7 PDE8	E
Cyone nucleotide prioapriodiesterase o	r DLO	Ε

Cyclic nucleotide phosphodiesterase 9A	PDE9A	Ε
Cyclin-dependent kinase 2	CDK2	G
Cyclin-dependent kinase inhibitor 1C (P57,	CDKN1C	G
KIP2)		Ŭ
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	G
Cyclooxygenase 1	COX1	E
Cyclooxygenase 2	COX2	E
CYP11A1	CYP11A1	Ē
CYP11B1	CYP11B1	Ē
CYP11B2	CYP11B2	Ē
CYP17	CYP17	Ē
CYP19	CYP19	Ē
CYP1A1	CYP1A1	Ē
CYP1A2	CYP1A2	Ē
CYP1B1	CYP1B1	E
CYP21	CYP21	Ē
CYP24	CYP24	E
CYP27	CYP27	Ē
CYP27B1	PDDR	E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	Ē
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A7	E
CYP2B6	CYP2B6	Ē
CYP2C18	CYP2C18	Ē
CYP2C19	CYP2C19	E
CYP2C8	CYP2C8	E
CYP2C9	CYP2C9	E
CYP2D6	CYP2D6	Ē
CYP2E1	CYP2E1	Ē
CYP2F1	CYP2F1	E
CYP2J2	CYP2J2	Ε
CYP3A3	CYP3A3	Ε
CYP3A4	CYP3A4	Ε
CYP3A5	CYP3A5	Ε
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	E
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	Ε
CYP4F3	CYP4F3	E
CYP51	CYP51	E
CYP5A1	CYP5A1	E
CYP7A	CYP7A	E
CYP8	CYP8	Ē
Cystathionase	CTH	E
Cystathione beta synthase	CBS	Ē
Cystic fibrosis transmembrane conductance	CFTR	N

manufaction OFTD	•	
regulator, CFTR	·	
Cystinosin	CTNS	T
Cytidine deaminase	CDA	Ε
Cytidine-5-prime-triphosphate synthetase	CTPS	Ε
Cytochrome a		Ε
Cytochrome b-245 alpha	CYBA	Ε
Cytochrome b-245 beta	CYBB	E
Cytochrome b-5	CYB5	F
Cytochrome c		E
Cytochrome c oxidase, MTCO		E
Cytokine-suppressive antiinflammatory drug-	CSBP1	Ī
binding protein 1		•
Cytokine-suppressive antiinflammatory drug-	CSBP2	ľ
binding protein 2	33B. Z	'
DAX1 nuclear receptor	DAX1	
Deafness dystonia peptide	DDP	I N
Delta 4-5 alpha-reductase	DDF	Й
Delta aminolevulinate dehydratase	ALAD .	E
Delta(4)-3-oxosteroid 5-beta-reductase	ALAD .	E
	DUCD7:	E
Delta-7-dehydrocholesterol reductase	DHCR7	E
Dentin sialophosphoprotein	DSPP	G
Desmin	DES	S
DHEA sulfotransferase	STD	E
Diastrophic dysplasia sulfate transporter	DTD	T
Dihydrolipoamide dehydrogenase	DLD	N
Dihydroxyacetonephosphate acyltransferase	DHAPAT	Ε
DNA damage binding protein, DDB1	DDB1	S
DNA damage binding protein, DDB2	DDB2	S
DNA methyltransferase	DNMT	Ε
DNA-damage-inducible transcript 3	DDIT3	S
Dopamine receptors D1	DRD1	Ν
Dopamine receptors D2	DRD2	Ν
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	Ν
Dopamine receptors D5	DRD5	N
Dynamin	DNM1	G
Dynorphin receptor		Ñ
Dyskerin	DKC1	S
Dystonia 1	DYT1	S
Dystonia 3	DYT3	S
Dystonia 6	DYT6	S
Dystonia 7	DYT7	S
Dystrophia myotonica	DM, DMPK	
Dystrophia myotonica, atypical	DM2	E
Dystrophin	DMD	נו
		S
Dystrophin-associated glycoprotein 35kD, SCGD	SGCD	S.
Dystrophin-associated glycoprotein 35kD,	SGCG	S

SGSG		
Dystrophin-associated glycoprotein 43kD	SGCB	s
Dystrophin-associated glycoprotein 50kD	SGCA	Š
Ectodermal Dysplasia 1 gene	ED1	S
Elastase 1	ELAS1	E
Elastase 2	ELAS2	
Elastin	ELN c	E
Electron-transfering-flavoprotein alpha	ETFA	S
_ · · · · · · · · · · · · · · · · · · ·	ETFB	T
Electron-transfering-flavoprotein beta		T
Electron-transferring flavoprotein	ETFDH	Ε
dehydrogenase	514D	_
Emerin	EMD	Т
Endocardial fibroelastosis 2 gene	EFE2	S
Endometrial bleeding-associated factor	EBAF	G
Endothelin 1	EDN1	Ν
Endothelin 2	EDN2	Ν
Endothelin 3	EDN3	Ν
Endothelin converting enzyme	ECE1	N
Endothelin receptor type A	EDNRA	Ν
Endothelin receptor type B	EDNRB	Ν
Engrailed-1	EN1	G
Engrailed-2	EN2	G
Enolase	ENO1	Ε
Enoyl CoA hydratase		Ε
Enoyl CoA isomerase	·	Ε
Enoyl CoA reductase		Ε
Enterokinase	PRSS7, ENTK	Ε
Ephrin receptor tyrosine kinase A	EPHA	G
Ephrin receptor tyrosine kinase B	EPHB	G
Epidermal growth factor	EGF	G
Epidermal growth factor receptor	EGFR	G
Erythrocyte membrane protein band 4.1	EPB41	S
Erythropoietin	EPO	ı
Erythropoietin receptor	EPOR	i
Estrogen receptor	ESR	G
Exostosin 1	EXT1	S
Exostosin 2	EXT2	s
Exostosin 3	EXT3	S
Eye colour gene 3 (brown)	EYCL3	Š
Eyes absent 1	EYA1	Ğ
Faciogenital dysplasia	FGD1, FGDY	T
Factor 1 (No. one)	F1	i
Factor B, properdin		i
Factor D		,
Factor H	HF1	ı
Factor X	F10	1
Fanconi anemia, complementation group A	FANCA	T
Fanconi anemia, complementation group C	FANCC	۱ ۲
i ancom anemia, complementation group C	IANCO	T

Fanconi anemia, complementation group D	FANCD	. T
Fc fragment of IgG, high affinity IA, receptor for	FCGR1A	G
	E00D04	_
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	G
Ferritin, H subunit		_
Ferritin, L subunit		T
Fibrillin 1	FTL	T
Fibrillin 2	FBN1	G
	FBN2	G
Fibrinogen alpha	FGA	S
Fibrinogen beta	FGB	S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Fibronectin precursor	FN1	G
Flightless-II, Drosophila homolog of	FLII	G
Folic acid receptor	FOLR	G
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Forkhead transcription factor 10	FKHL10	G
Forkhead transcription factor 14	FKHL14	G
Forkhead transcription factor 7	FKHL7	G
Fragile site, folic acid type, rare, fra(X) A	FRAXA	Ν
Frataxin	FRDA	G
Fringe secreted protein, lunatic	LFNG	G
Fringe secreted protein, manic	MFNG	G
Fringe secreted protein, radical	RFNG	G
Fructose-1,6-diphosphatase	FBP1	E
Fucosidase alpha-L-1	FUCA1	Ε
Fucosidase alpha-L-2		E
Fukuyama type congenital muscular	FCMD	G
dystrophy		
Fumarase	FH	E
GABA receptor, alpha 1	GABRA1	Ν
GABA receptor, alpha 2	GABRA2	Ν
GABA receptor, alpha 3	GABRA3	 ~N~~
GABA receptor, alpha 4	GABRA4	Ν
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	N
GABA receptor, beta 1	GABRB1	N
GABA receptor, beta 2	GABRB2	N
GABA receptor, beta 3	GABRB3	N
GABA receptor, gamma 1	GABRG1	N
GABA receptor, gamma 2	GABRG2	N
GABA receptor, gamma 3	GABRG3	N
Galactocerebrosidase	GALC	E
		_

	Calastakinasa	0 4144	
	Galactokinase	GALK1	E
	Galactose 1-phosphate uridyl-transferase	GALT	Ε
	Gamma-glutamyl carboxylase	GGCX	Т
	Gap junction protein alpha 3	GJA3	T
	Gap junction protein alpha 8	GJA8	Τ
	Gap junction protein beta 3	GJB3	T
	Gastrointestinal tumor-associated antigen 1	GA733	ı
	Gastrulation brain homeobox 2	GBX2	G
	Glucosidase, acid alpha	GAA	Ε
	Glucosidase, acid beta	GBA	Ε
	Glutamate receptor 1	GLUR1	N
	Glutamate receptor 2	GLUR2	Ν
	Glutamate receptor 3	GLUR3	Ν
	Glutamate receptor 4	GLUR4	N
	Glutamate receptor 5	GLUR5	N
	Glutamate receptor 6	GLUR6	N
	Glutamate receptor 7	GLUR7	N
	Glutamate receptor, ionotropic, NMDA 1	NMDAR1	N
	Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	N
	Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	N
	Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	N
	Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	N
	Glutathione	GSH	Ť
1	Glutathione peroxidase, GPX1	GPX1	Ė
	Glutathione S-transferase, GSTZ1	GSTZ1	Ē
	Glyceraldehyde-3-phosphate	GAPDH	Ē
	dehydrogenase, GAPDH		-
	Glycerol kinase	GK	Ε
(Glycinamide ribonucleotide (GAR)	GART	Ē
	transformylase		_
(Glycine receptor, alpha	GLRA2	N
(Glycine receptor, beta	· · · -	N
(Glycine transporter	GLYT	N
(Glycogen phosphorylase	PYGL	E
(Glycosyltransferases, ABO blood group	ABO	Ē
	GM2 ganglioside activator protein, GM2A	GM2A	Ē
	Green cone pigment	GCP	S
	Growth arrest-specific homeobox	GAX	_
	Growth factor receptor-bound protein 2	GRB2	G
	Growth hormone 1	GH1	G
(Growth hormone 2 (placental)	GH2	G
	Growth hormone receptor	GHR	G
	Growth hormone releasing hormone (GHRH)		G
	Growth hormone releasing hormone receptor		G
	Growth/differentiation factor 5	GDF5	G
	GTP cylcohydrolase 1	GCH1	G
	GTPase-activating protein, GAP	RASA1	G
	Guanidinoacetate N-methyltransferase	GAMT	<u> </u>
		· · · · ·	

Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNAO1	Ν
Guanine nucleotide-binding protein, alpha	GNAI1	N
inhibiting activity polypeptide 1, GNAI1 Guanine nucleotide-binding protein, alpha	GNAI2	N
inhibiting activity polypeptide 2, GNAI2 Guanine nucleotide-binding protein, alpha	GNAI3	N
inhibiting activity polypeptide 3, GNAI3 Guanine nucleotide-binding protein, alpha	GNAS1	N
stimulating activity polypeptide, GNAS1 Guanine nucleotide-binding protein, alpha	GNAS2	N
stimulating activity polypeptide, GNAS2 Guanine nucleotide-binding protein, alpha	GNAS3	N
stimulating activity polypeptide, GNAS3 Guanine nucleotide-binding protein, alpha	GNAS4	N
stimulating activity polypeptide, GNAS4 Guanine nucleotide-binding protein, alpha	GNAT1	N
transducing activity polypeptide, GNAT1 Guanine nucleotide-binding protein, alpha	GNAT2	
transducing activity polypeptide, GNAT2 Guanine nucleotide-binding protein, beta	GNB3	N
polypeptide 3	•	N
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	N
Guanine nucleotide-binding protein, q polypeptide	GNAQ	N
Guanylate cyclase 2D, membrane (retinaspecific)	GUCY2D	E
Guanylate cyclase activator 1A (retina) H(+), K(+) - ATPase	GUCA1A ATP4B	E N
Haeme regulated inhibitor kinase	•	E
Haemoglobin alpha 1	HBA1	Т
Haemoglobin alpha 2	HBA2	T
Haemoglobin beta	HBB HBD	Ţ
Haemoglobin delta Haemoglobin gamma A	HBG1	T
Haemoglobin gamma B	HBG2	T T
Haemoglobin gamma G	HBGG	Ţ
	HR	Ġ
Heat shock protein, HSP60		Ĭ
Heat shock protein, HSP70	•	Ì
Heat shock protein, HSP90		1
Heat shock protein, HSPA1		1
Heat shock protein, HSPA2	-	1
Heparan sulfamidase		E
Heparin binding epidermal growth factor	HBEGF	G
Heparin Cofactor II	HCF2	1
Hepatocyte growth factor	HGF	G

Hermansky-pudlak syndrome gene	HPS	Т
Hexokinase 2	HK2	E
Hexosaminidase A	HEXA,TSD	Ε
Hexosaminidase B	HEXB	Ε
Histamine receptors, H1		N
Histamine receptors, H2		N
Histamine receptors, H3		N
HLA-B associated transcript 1	BAT1	Į.
Holocarboxylase synthetase	HLCS	· E
Holoprosencephaly 1	HPE1	G
Holoprosencephaly 2	HPE2	G
Holoprosencephaly 3	HPE3	G
Holoprosencephaly 4	HPE4	G
Homeobox (HOX) gene A1	HOXA1	Ğ
Homeobox (HOX) gene A10	HOXA10	Ğ
Homeobox (HOX) gene A11	HOXA11	Ğ
Homeobox (HOX) gene A12	HOXA12	Ğ
Homeobox (HOX) gene A13	HOXA13	Ğ
Homeobox (HOX) gene A2	HOXA2	Ğ
Homeobox (HOX) gene A3	HOXA3	Ğ
Homeobox (HOX) gene A4	HOXA4	Ğ
Homeobox (HOX) gene A5	HOXA5	Ğ
Homeobox (HOX) gene A6	HOXA6	Ğ
Homeobox (HOX) gene A7	HOXA7	Ğ
Homeobox (HOX) gene A8	HOXA8	Ğ
Homeobox (HOX) gene A9	HOXA9	Ğ
Homeobox (HOX) gene B1	HOXB1	Ğ
Homeobox (HOX) gene B2	HOXB2	G
Homeobox (HOX) gene B3	HOXB3	Ğ
Homeobox (HOX) gene B4	HOXB4	Ğ
Homeobox (HOX) gene B5	HOXB5	Ğ
Homeobox (HOX) gene B6	HOXB6	Ğ
Homeobox (HOX) gene B7	HOXB7	Ğ
Homeobox (HOX) gene B8	HOXB8	Ğ
Homeobox (HOX) gene B9	HOXB9	Ğ
Homeobox (HOX) gene C13	HOXC13	Ğ
Homeobox (HOX) gene C4	HOXC4	Ğ
Homeobox (HOX) gene C8	HOXC8	.G
Homeobox (HOX) gene C9	HOXC9	Ğ
Homeobox (HOX) gene D1	HOXD1	Ğ
Homeobox (HOX) gene D10	HOXD10	Ğ
Homeobox (HOX) gene D12	HOXD12	Ġ
Homeobox (HOX) gene D13	HOXD13	Ğ
Homeobox (HOX) gene D3	HOXD3	G
Homeobox (HOX) gene D4	HOXD4	G
Homeobox (HOX) gene D8	HOXD4	G
Homeobox (HOX) gene D9	HOXD9	G
Homeobox 11	HOX11	G
I IOITICODOX I I	HOATT	G

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Homeobox HB24	HLX1	G
Homeobox HB9	HLXB9	G
Homeobox, PROX1	PROX1	G
Homogentisate 1,2 dioxygenase	HGD	Ε
Human placental lactogen	CSH1	G
Hypoxia inducible factor 1	HIF1A	E
Hypoxia inducible factor 2		E
IC7 A and B	•	ī
	IGER	i
Immunoglobulin E (IgE) reponsiveness gene		
Indian hedgehog, ihh	IHH	G
Inhibin, alpha	INHA	G
Inhibin, beta A	INHBA	G
Inhibin, beta B	INHBB	G
Inhibin, beta C	INHBC	G
Inositol 1,4,5-triphosphate receptor 3	ITPR3	G
Insulin promotor factor 1	IPF1	G
Insulin-like growth factor 1	IGF1	G
Insulin-like growth factor 1 receptor	IGF1R	G
Insulin-like growth factor 2	IGF2	G
Insulin-like growth factor 2 receptor	IGF2R	G
Integrin beta 1	ITGB1	G
Integrin beta 3	ITGB3	G
Integrin beta 4	ITGB4	G
Integrin, alpha 5	ITGA5	G
Integrin, alpha 7	ITGA7	Ğ
Inter-alpha-trypsin inhibitor, IATI	., .,	E
Interferon alpha	IFNA1	ī
Interferon beta	IFNB	i
Interferon gamma	IFNG	i
	IFNGR1	i
Interferon gamma receptor 1	IFNGR2	i
Interferon gamma receptor 2	IRF1	1
Interferon regulatory factor 1		1
Interferon regulatory factor 4	IRF4	!
Interleukin(IL) 1 receptor	IL1R	
Interleukin(IL) 1, alpha	IL1A	!
Interleukin(IL) 1, beta	IL1B	!
Interleukin(IL) 10	IL10	1
Interleukin(IL) 10 receptor	IL10R	÷ .
Interleukin(IL) 11	IL11	ı
Interleukin(IL) 11 receptor	IL11R	ı
Interleukin(IL) 12	IL12	i
Interleukin(IL) 12 receptor, beta 1	IL12RB1	1
Interleukin(IL) 13	IL13	ı
Interleukin(IL) 13 receptor	. IL13R	ı
Interleukin(IL) 2	IL2	i
Interleukin(IL) 2 receptor, alpha	IL2RA	1
Interleukin(IL) 2 receptor, gamma	IL2RG	1
Interleukin(IL) 3	IL3	1
	- 	•

	•	
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	i
Interleukin(IL) 4 receptor	IL4R	1
Interleukin(IL) 5	IL5	i
Interleukin(IL) 5 receptor	IL5R	i
Interleukin(IL) 6	IL6	1
Interleukin(IL) 6 receptor	IL6R	i
Interleukin(IL) 7	IL7	i
Interleukin(IL) 7 receptor	IL7R	i
Interleukin(IL) 8	IL8	i
Interleukin(IL) 8 receptor	IL8R	i
Interleukin(IL) 9	IL9	1
Interleukin(IL) 9 receptor	IL9R	i
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	i
Isocitrate dehydrogenase	,	Ė
Kaliman syndrome gene 1	KAL1	Ğ
Keratin 1	KRT1	S
Keratin 10	KRT10	S S S
Keratin 11	KRT11	S
Keratin 12	KRT12	S
Keratin 13	KRT13	S
Keratin 14	KRT14	S
Keratin 15	KRT15	S S
Keratin 16	KRT16	S
Keratin 17	KRT17,PCHC1	S
Keratin 18	KRT18	S
Keratin 2	KRT2	S
Keratin 3	KRT3	S
Keratin 4	KRT4	Š
Keratin 5	KRT5	Š
Keratin 6	KRT6	Š
Keratin 7	KRT7	S
Keratin 8	KRT8	S
Keratin 9	KRT9	S
Keratin, hair acidic 1	KRTHA1	S
Keratin, hair basic 2	KRTHB1	S
Keratin, hair basic 6	KRTHB6	S
Kininogen, High molecular weight	KNG	
Lactate dehydrogenase, A	LDHA	Ė
Lactate dehydrogenase, B	LDHB	E
Lamin A/C	LMNA	G
Laminin 5, alpha 3	LAMA3	Ğ
Laminin 5, beta 3	LAMB3	Ğ
Laminin 5, gamma 2	LAMC2	Ğ
Laminin M	LAMM	Ğ
Laminin receptor 1	LAMR1	Ğ
Latent transforming growth factor-beta	LTBP2	Ğ
binding protein 2		_
•		

Leukocyte-specific transcript 1 Leukotriene A4 hydrolase	LST-1	1
Leukotriene A4 synthase	LTA4S	E
Leukotriene B4 receptor	217(10	1
Leukotriene B4 synthase	LTB4S	Ė
Leukotriene C4 receptor		Ī
Leukotriene C4 synthase	LTC4S	Ė
LIM homeobox transcription factor 1, beta	LMX1B	Ğ
Limb girdle muscular dystrophy 1A	LGMD1A	Ğ
Limb girdle muscular dystrophy 1B	LGMD1B	G
Limb girdle muscular dystrophy 2G	LGMD2G	G
Limb girdle muscular dystrophy 2H	LGMD2H	G
Limbic associated membrane protein	LAMP	G
Lipoprotein receptor, Low Density	LDLR	Т
Lipoxygenase 12 (platelets)	LOG12	1
Loricrin	LOR	S
Low density lipoprotein receptor-related	LRP	Т
protein precursor		•
Luteinizing hormone-releasing hormone		· N
Luteinizing hormone-releasing hormone		, N
receptor		
lymphotoxin		
Lysosome-associated membrane protein 1	LAMP1	G
Lysosome-associated membrane protein 2	LAMP2	G
Lysozyme	LYZ	<u>1</u>
Lysyl hydroxylase	PLOD	E
Lysyl oxidase	LOX	E
Macrophage activating factor	MAF	!
Macrophage inflammatory protein-1	MIP1	. !
Macrophage inflammatory protein-1 receptor	MIDO	!
Macrophage inflammatory protein-2	MIP2	!
Macrophage inflammatory protein-2 receptor	145504	1
MADS box transcription-enhancer factor 2A	MEF2A	G
MADS box transcription-enhancer factor 2B	MEF2B	G
MADS box transcription-enhancer factor 2C	MEF2C	G
MADS box transcription-enhancer factor 2D	MEF2D	G
Mannose binding protein	MBP	!
Mannosidase, alpha B lysosomal	MANB	E
Mannosidase, beta A lysosomal	MANBA	E
Marenostrin	MEFV	T
Matrix Gla protein	MGP	G
Matrix metalloproteinase 1	MMP1	E
Matrix metalloproteinase 10	MMP10	E
Matrix metalloproteinase 11	MMP11	·
Matrix metalloproteinase 12	MMP12	E
Matrix metalloproteinase 13	MMP13	E
Matrix metalloproteinase 14	MMP14	E
Matrix metalloproteinase 15	MMP15	Е

Matrix metalloproteinase 16	MMP16	Ε
Matrix metalloproteinase 17	MMP17	Ē
Matrix metalloproteinase 18	MMP18	Ē
Matrix metalloproteinase 19	MMP19	Ē
Matrix metalloproteinase 2	MMP2	E
Matrix metalloproteinase 3	MMP3, STMY1	Ē
Matrix metalloproteinase 4	MMP4	E
Matrix metalloproteinase 5	MMP5	Ē
Matrix metalloproteinase 6	MMP6	Ē
Matrix metalloproteinase 7	MMP7	E
Matrix metalloproteinase 8	MMP8	E
Matrix metalloproteinase 9	MMP9	Æ
MEK kinase, MEKK	IVIIVII O	Ę
Melanocortin 1 receptor	MC1R	Ţ
Melanocortin 2 receptor	MC2R	Ť
Melanocortin 4 receptor	MC4R	
Mesoderm-specific transcript	MEST	T
Methylguanine-DNA methyltransferase	MGMT	G
Methylmalonyl-CoA mutase	MUT	E
Mevalonate kinase	MVK	E
MHC Class I: A	IVIVIX	Е
MHC Class I: B		
MHC Class I: C		I I
MHC Class I: LMP-2, LMP-7		j 1
MHC Class I: EMF-2, EMF-7	ADCD TADA	1
MHC Class II: DP	ABCR, TAP1 HLA-DPB1	!
MHC Class II: DQ	TLA-UPB I	ı,
MHC Class II: DR		
	TADO DOCO	l l
MHC Class II: Tap2	TAP2, PSF2 MHC2TA	!
MHC Class II:Complementation group A		
MHC Class II:Complementation group B	rfxank	!
MHC Class II:Complementation group C	RFX5	
MHC Class II:Complementation group D	RFXAP	ľ
Microphthalmia-associated transcription	MITF	G
factor Midline 1	14154	_
	MID1	G
Mitochondrial trifunctional protein, alpha subunit	HADHA	E
Mitochondrial trifunctional protein, beta	 LIADUD	
subunit	HADHB	E
Moesin, MSN		c
Molybdenum cofactor synthesis 1	MOCS1	S
Molybdenum cofactor synthesis 2	MOCS1	E
Monoamine oxidase A	MAOA	E
Monoamine oxidase B	MAOB	E
Monocyte chemoattractant protein 1	MCP1	E
Mucolipidoses	GNPTA	١
Mulibrey nanism		E
Minimish Halligh	MUL	Т

Muscarinic receptor, M1	CHRM1	N
Muscarinic receptor, M2	CHRM2	N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	N
Muscarinic receptor, M5	CHRM5	Ν
Muscle phosphorylase	PYGM	Ε
Mutated in colorectal cancers, MCC	MCC	G
MutS homolog 3	MSH3	G
Myeloperoxidase	MPO	<u> </u>
Myocilin	MYOC	Ţ
Myogenic factor 3	MYF3	G
Myogenic factor 4	MYF4	G
Myogenic factor 5	MYF5	G
Myoglobin	10/01/4	T
Myomesin 1	MYOM1	S
Myomesin 2	MYOM2	S
Myopia 1	MYP1	T
Myopia 2	MYP2	T
Myosin 15	MYO15	S
Myosin 5A	MYO5A	S
Myosin 6	MYO6	S
Myosin 7A	MYO7A	S
Myosin, cardiac	MYH7	S
Myosin, light chain 2	MYL2	S
Myosin, light chain 3	MYL3	S S
Myotubularin	MTM1	
Na+, K+ ATPase, alpha	ATP1A1	G
Na+, K+ ATPase, beta 1	ATP1B1	G
Na+, K+ ATPase, beta 2	ATP1B2	G
Na+, K+ ATPase, beta 3	ATP1B3 NHE1	G
Na+/H+ exchanger 1	NHE2	T
Na+/H+ exchanger 2	NHE3	T
Na+/H+ exchanger 3 Na+/H+ exchanger 4	NHE4	T
Na+/H+ exchanger 5	NHE5	T
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	T
N-acetylglucosamine-6-sulfatase	GNS	E
N-acetylglucosaminidase, alpha	NAGLU	E
NADH dehydrogenase	NAGEO	E.
NADH-cytochrome b5 reductase	DIA1	E
NADPH-dependent cytochrome P450	POR	E
reductase	FOR	_
NB6		1
Nebulin	NEB	1
Nephrosis 1	NPHS1	S
Neural retina-specific gene	NRL	T
Neuraminidase sialidase	NEU	G
Neuregulin		T
rveureguiiri	HGL	G

Neurexin			N
Neuroendocrine convertase 1	NEC1, PCSK1	l	E
Neurokinin A	NKNA		N
Neurokinin B	NKNB		N
Neuropeptide Y	NPY		
Neuropeptide Y receptor Y1	NPY1R		N
· · ·			N
Neuropeptide Y receptor Y2	NPY2R		N
Neurotensin	NTS		N
Neurotensin receptor	NTSR1		N
Nibrin	NBS1		G
Noggin	NOG		G
Notch ligand - jagged 1	JAG1, AGS		G
Nuclear factor I-kappa-B-like gene	IKBL		ı
Nuclear factor kappa beta	NFKB	•	1
Nuclear factor of activated T cells (NFAT)	NFATC		G
complex, cytosolic			
Nuclear factor of activated T cells (NFAT)	NFATP		G
complex, preexisting component			
Ocular albinism 1	OA1	•	S
Oculocutaneous albinism II	OCA2		S
Oncogene ERG (early reponse gene)		F	G
Oncogene fos	FOS		G
Oncogene GLI1	GLI		G
Oncogene GLI2	GLI2		G
Oncogene GLI3	GLI3		Ğ
Oncogene sis	PDGFB		Ğ
Oncogene src			Ğ
Opioid receptor, delta	OPRD1		N
Opioid receptor, kappa	OPRK1		N
Opioid receptor, mu	OPRM1		N
Ornithine delta-aminotransferase	OAT		E
Osteocalcin			s
Osteonectin	ON		Ğ
Osteopontin	OPN		G
Osteoprotegerin	OPG		G
Oxytocin	OXT		N
Oxytocin receptor	OXTR		N
p21-activated kinase 3	PAK3		
Paired box homeotic gene 1	PAX1		G
			G
Paired box homeotic gene 2	PAX2		G
Paired box homeotic gene 3	PAX3		G
Paired box homeotic gene 6	PAX6		G
Paired box homeotic gene 7	PAX7		G
Paired box homeotic gene 8	PAX8		G
Paired-like homeodomain transcription factor	PIIX2		G
2			
Paired-like homeodomain transcription factor	PITX3	•	G
3			

Parathyroid hormone Parathyroid hormone receptor Parathyroid hormone related-peptide Parathyroid hormone-like hormone Patched (Drosophila) homolog, PTCH Peanut-like 1 Peripherin, PRPH Peroxisomal membrane protein 1 Peroxisomal membrane protein 3 Peroxisome biogenesis factor 1 Peroxisome biogenesis factor 1 Peroxisome biogenesis factor 6 Peroxisome biogenesis factor 7 Peroxisome receptor 1	PTH PTHR1 PTHrP PTHLH PTCH PNUTL1 PXMP1 PXMP3 PEX1 PEX19 PEX6 PEX7 PXR1	GGGGGISSTTTTT
Phenylethanolamine N-methyltransferase,	PNMT	Ė
PNMT Phosphate regulating gene with homologies to endopeptidases on the X chromosome	PHEX	G
Phosphodiesterase 1 / nucleotide pyrophosphatase 1	PDNP1	G
Phosphodiesterase 1 / nucleotide	PDNP2	· G
pyrophosphatase 2 Phosphodiesterase 1 / nucleotide pyrophosphatase 3	PDNP3	G
Phosphofructokinase, muscle Phosphoglucose isomerase Phosphoglycerate kinase 1 Phosphoglycerate mutase 2 Phospholipase A2, group 10 Phospholipase A2, group 1B Phospholipase A2, group 2A Phospholipase A2, group 2B Phospholipase A2, group 4A Phospholipase A2, group 4C Phospholipase A2, group 5 Phospholipase A2, group 6 Phosphomannomutase 2 Phosphoribosyl pyrophosphate synthetase Phosphorylase kinase, alpha 1 (muscle) Phosphorylase kinase, beta Phosphorylase kinase, delta Phosphorylase kinase, gamma 2 Phytanoyl-CoA hydroxylase Pineolytic beta-receptors Plakophilin 1	PFKM GPI PGK1 PGAM2 PLA2G10 PLA2G1B PLA2G2A PLA2G2B PLA2G4A PLA2G4C PLA2G5 PLA2G6 PMM2 PRPS1 PHKA1 PHKB PHKG2 PHYH	⊞⊞⊞⊞−−−−−−−G⊞⊞⊞⊞⊞G⊞干
Plasminogen Platelet derived growth factor Platelet derived growth factor receptor	PLG PDGF PDGFR	E G G

Plectin 1 Potassium inwardly-rectifying channel J1 Potassium voltage-gated channel E1 Potassium voltage-gated channel Q1 Potassium voltage-gated channel Q2 Potassium voltage-gated channel Q3 POU domain, class 3, transcription factor 4 POU domain, class 4, transcription factor 3 Prion protein Procollagen N-protease Procollagen peptidase Prodynorphin Profibrinolysin Progesterone receptor (RU486 binding	PLEC1 KCNJ1 KCNE1 KCNQ1 KCNQ2 KCNQ3 POU3F4 POU4F3 PRNP	- Z Z Z Z Z O O Z M M Z O O
receptor)		
Prolactin receptor	PRLR	G
Prolactin releasing hormone	PRH	G
Proliferin	PLF	G
Proopiomelanocortin	POMC	Ν
Properdin P factor, complement	PFC, PFD	l -
Prophet of Pit1	PROP1	G
Propionyl-CoA carboxylase, alpha	PCCA	E
Prosaposin	PSAP	N
Prostacyclin synthase	HODD, DODLI	!
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	!
Prostaglandin D - DP receptor		1
Prostaglandin E1 receptor		1
Prostaglandin E2 receptor		-
Prostaglandin E3 receptor Prostaglandin F - FP receptor		1
Prostaglandin F2 alpha receptor.		1
Prostaglandin I2 receptor		Ť
Prostaglandin IP receptor	·	1
Prostaglandin isomerase		G
Protease nexin 2	PN2	E
Protective protein for beta-galactosidase	PPGB	Ē
Protein C	PROC	Ī
Protein S	FROC	-
Purine nucleoside phosphorylase	NP	I E
Purinergic receptor P1A1	141	N
Purinergic receptor P1A2		N
Purinergic receptor P1A3		N
Purinergic receptor P2X, 1	P2RX1	N
Purinergic receptor P2X, 2	P2RX2	N
Purinergic receptor P2X, 3	P2RX3	N
Purinergic receptor P2X, 4	P2RX4	N
Purinergic receptor P2X, 5	P2RX5	N
Purinergic receptor P2X, 6	P2RX6	N
annergio receptor i ZA, o	. 2100	IN

Purinergic receptor P2X, 7	P2RX7	Ν
Purinergic receptor P2Y, 1	P2RY1	Ν
Purinergic receptor P2Y, 11	P2RY11	Ν
Purinergic receptor P2Y, 2	P2RY2	Ν
Pyrroline-5-carboxylate synthetase	PYCS	Ε
Pyruvate kinase	PKLR	Ē
Rabphilin		N
Radixin	RDX	s
RAS-associated protein, RAB3A	RAB3A	N
Rathke pouch homeobox, RPX	RPX	G
Receptor tyrosine kinase (RTK), Nsk2	NSK2	G
Retinal pigment epithelium specific protein	RPE65	S
	NF LOS	3
(65kD) Retinition pigmentose gone 1	RP1	
Retinitis pigmentosa gene 1		S
Retinitis pigmentosa gene 2	RP2	S
Retinitis pigmentosa gene 3	RP3	S
Retinitis pigmentosa gene 6	RP6	S
Retinitis pigmentosa gene 7	RP7, RDS	S
Retinoblastoma 1	RB1	G
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoid X receptor, alpha	RXRA	G
Retinoid X receptor, beta	RXRB	G
Retinoid X receptor, gamma	RXRG	G
Retinol binding protein 4	RBP4	Т
Rhodopsin	RHO	S
RIGUI	RIGUI	G
Rim		Ν
Rod outer segment membrane protein 1	ROM1	S
Ryanodine receptor 1, skeletal	RYR1	G
Serotonin N-acetyltransferase	SNAT	E
Serotonin receptor, 5HT1A	HTR1A	N
Serotonin receptor, 5HT1B	HTR1B	N
Serotonin receptor, 5HT1C	HTR1C	N
Serotonin receptor, 5HT1D	HTR1D	N
Serotonin receptor, 5HT1E	HTR1E	N
Serotonin receptor, 5HT1F	HTR1F	N
Serotonin receptor, 5HT2A	HTR2A	N
Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	N
Serotonin receptor, 5HT4	HTR4	
•		N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sex hormone binding globulin, SHBG	505	T
Sialoprotein, bone	BSP	G

Signal transducer and activator of transcription 1	STAT1	•	G
Signaling lymphocyte activation molecule	SLAM		r
Sine oculis homeobox, drosophila, homolog 1			1
			G
Sine oculis homeobox, drosophila, homolog 2			G
Sine oculis homeobox, drosophila, homolog 5			G
Sjoegren (Sjogren) syndrome antigen A1	SSA1		1
Slug protein			G
Small nuclear ribonucleoprotein polypeptide	SNRPN		S
N ,			
Smoothelin	SMTN		G
Smoothened (Drosophila) homolog	SMOH		G
Sodium channel, non-voltage gated 1, alpha	SCNN1A		N
Sodium channel, non-voltage gated 1, beta	SCNN1B		N
Sodium channel, non-voltage gated 1,	SCNN1G		N
gamma	00		14
Sodium channel, voltage gated, type IV,	SCN4A		Ν
alpha polypeptide	001177		IV
Sodium channel, voltage gated, type V, alpha	SCNEA		N
polypeptide	SONSA		IN
Sodium channel, voltage-gated, type 1, beta	SCN4B		N.I.
polypeptide	SCIVID		· N
Solute carrier family 1 (glutamate	SLC1A1		_
, ,,	SECIAI		T
transporter), member 1	01.0440		-
Solute carrier family 1 (glutamate	SLC1A2		Т
transporter), member 2	01 0404		_
Solute carrier family 12, member 1	SLC12A1		T
Solute carrier family 12, member 2	SLC12A2		Т
Solute carrier family 12, member 3	SLC12A3	•	Т
Solute carrier family 16 (monocarboxylate	SLC16A1		Т
transporter), member 1			
Solute carrier family 16 (monocarboxylate	SLC16A7		Т
transporter), member 7			
Solute carrier family 17, member 1	SLC17A1		Т
Solute carrier family 17, member 2	SLC17A2		Т
Solute carrier family 19 (folate transporter),	SLC19A1		Т
member 1			•
Solute carrier family 21, member 2	SLC21A2		Т
Solute carrier family 21, member 3	SLC21A3		Т
Solute carrier family 25, member 12	SLC25A12		· †
Solute carrier family 6 (GAMMA-	SLC6A1		Ť
AMINOBUTYRIC ACID transporter), member	CECOAT		'
1			
•	CLCGAS		_
Solute carrier family 6 (neurotransmitter	SLC6A3		Т
transporter, dopamine), member 3	CI CEAC		
Solute carrier family 6 (neurotransmitter	SLC6A2		Т
transporter, noradrenaline), member 2	01.004.40		_
Solute carrier family 6, member 10	SLC6A10		Т

Solute carrier family 6, member 8	SLC6A8	Т
Solute carrier family 7(amino acid	SLC7A1	τ̈
transporter), member 1		•
Solute carrier family 7(amino acid	SLC7A2	Т
transporter), member 2		•
Solute carrier family 7(amino acid	SLC7A7	т т
transporter), member 7		•
Solute carrier family 8 (sodium/calcium	SLC8A1	т
exchanger), member 1		·
Somatostatin	SST	· N
Somatostatin receptor, SSTR1	SSTR1	N
Somatostatin receptor, SSTR2	SSTR2	G
Somatostatin receptor, SSTR3	SSTR3	N
Somatostatin receptor, SSTR4	SSTR4	N
Somatostatin receptor, SSTR5	SSTR5	N
Sonic hedgehog, SHH	SHH	G
Sorbitol dehydrogenase	SORD	Е
Sorcin	SRI	Т
Spectrin alpha	SPTA1	S
Spectrin beta	SPTB	S
Sperm adhesion molecule	SPAM1	G
Sperm protamine P1	PRM1	G
Sperm protamine P2	PRM2	G
Sphingomyelinase	SMPD1	Ε
Split hand/foot malformation gene	DSS1	G
SRY-box 10	SOX10	G
SRY-box 11	SOX11	G
SRY-box 3	SOX3	G
SRY-box 4	SOX4	G
SRY-box 9	SOX9	G
Steroid 5 alpha reductase 1	SRD5A1	E
Steroid 5 alpha reductase 2	SRD5A2	Ε
Steroid sulphatase	STS	E
Substance P	•	N
Succinate dehydrogenase 1	SDH1	E
Succinate dehydrogenase 2	SDH2	E
Sulfamidase	SGSH	G
Superoxide dismutase 1	SOD1	E
Superoxide dismutase 3	SOD3	E
Survival of motor neuron 1, telomeric	SMN1	Ţ
Synapsin 1a & 1b	SYN1	N
Synapsin 2a & 2b	SYN2	N
Synaptic vesicle protein 2	SV2	N
Synaptobrevin 1	SYB1	N
Synaptobrevin 2	SYB2	N
Synaptogyrin		N
Synaptophysin	SYP	· N
Synaptosomal-associated protein, 25KD	SNAP25	N

Synaptotagmin 1	SYT1	N
Synaptotagmin 2	SYT2	N
Synovial sarcoma gene 1	SSX1	G
Synovial sarcoma gene 2	SSX2	G
Syntaxin 1	STX1	
Tachykinin receptor, NK1R	TACR1	N
Tachykinin receptor, NK1R Tachykinin receptor, NK2R		N
	TACR2	N
Tachykinin receptor, NK3R	TACR3	N
Talin, TLN	TDV4	S
T-BOX 1	TBX1	G
T-BOX 2	TBX2	G
T-BOX 3	TBX3	G
T-BOX 4	TBX4	G
T-BOX 5	TBX5	G
T-BOX 6	TBX6	G
TEK, tyrosine kinase, endothelial	TEK	E E
Telomerase protein component		E
Tetranectin	TNA	. Т
Thrombospondin	THBS1	G
Thromboxane A synthase 1	TBXAS1	1
Thromboxane A2	TXA2	
Thromboxane A2 receptor	TBXA2R	i
Thymosin		i
Thyrotropin releasing hormone	TRH	Ň
Thyrotropin releasing hormone	TRH	Ğ
Thyrotropin releasing hormone receptor	TRHR	N
Tip-associated protein	TAP	Î
Tissue non-specific alkaline phosphatase		Ė
TNSAP		-
Titin	TTN	S
Tocopherol (alpha) transfer protein	TTPA	T
Torticollis, keloids, cryptorchidism and renal	TKCR	Ġ
dysplasia gene	TROIT	G
Transforming growth factor, alpha	TGFA	G
Transforming growth factor, beta 2	TGFB2	
Transforming growth factor, beta induced	TGFBI	G
Transforming growth factor, beta receptor 2	TGFBR2	G G
Transglutaminase 1	TGM1	
Transglutaminase 2	TGM2	G
Transglutaminase 2		G
Transglutarinase 4 Transthyretin	TGM4	G
•	TTR	T
Treacle gene	TCOF1	G
Triosephosphate isomerase	TPI1	E
Tropomyosin 1 alpha	TPM1	S
Tropomyosin 3 (non-muscle)	TPM3	S
Troponin C		S
Troponin I	TNNI3	S
Troponin T2, cardiac	TNNT2	S

Trypsinogen 1	TRY1		Ε
Trypsinogen 2	TRY2		Ē
Tubby-like protein 1	TULP1		G
Tuberous sclerosis 1	TSC1		G
Tuberous sclerosis 2	TSC2		Ğ
Tumor susceptibility gene 101	TSG101		G
Tumour necrosis factor (TNF) receptor	TRAF1		1.
associated factor 1			•
Tumour necrosis factor (TNF) receptor	TRAF2		1
associated factor 2	110112		,
Tumour necrosis factor (TNF) receptor	TRAF3		1
associated factor 3	110410		•
Tumour necrosis factor (TNF) receptor	TRAF4		1
associated factor 4	1100 7		'
Tumour necrosis factor (TNF) receptor	TRAF5		ı
associated factor 5	110110		•
Tumour necrosis factor (TNF) receptor	TRAF6		1
associated factor 6	110110		ı
Tumour necrosis factor alpha	TNFA		1
Tumour necrosis factor alpha receptor	TNFAR		i
Tumour necrosis factor beta	TNFB		
Tumour necrosis factor beta receptor	TNFBR		i
Tumour protein p53	TP53, P53		Ġ
Tumour protein p63	TP63		Ğ
Tumour protein p73	TP73		G
Tumour protein, translationally-controlled 1	TPT1		G
Tumour suppresssor gene DRA	DRA		1
Tyrosinase	TYR		Ė
Tyrosinase-related protein 1	TYRP1	•	Ē
Tyrosine aminotransferase	TAT		Ē
Ubiquitin activating enzyme, E1			Ē
Ubiquitin protein ligase E3A	UBE3A		Ē
Uncoupling protein 3	UCP3		T
Undulin 1	COL14A1		s
Uroporphyrinogen decarboxylase	UROD		Ē
Usher syndrome 2A	USH2A		s
Vacuolar proton pump, subunit 1	VPP1		N
Vacuolar proton pump, subunit 3	VPP3	1011	N
Vascular endothelial growth factor	VEGF		G
Vasoactive intestinal polypeptide	VIP		N
Vasoactive intestinal polypeptide receptor	VIPR		N
Villin			s
Vinculin			S
Vitamin D receptor	VDR		Ğ
Vitelliform macular dystrophy, atypical gene	VMD1		T
Von Hippel-Lindau gene	VHL	•	Ġ
Von Willebrand factor	VWF		Т
Werner syndrome helicase	WRN		Ġ
• · · · · · · · · · · · · · · · · · · ·			_

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Wingless family, wnt8 WNT8 G Wiskott-Aldrich syndrome protein WASP, THC I Wnt inhibitory factor, WIF-1 WIF1 G Wolf-Hirschhorn syndrome candidate 1 gene WHSC1 G
Wolfram syndrome 1 gene WFS1 S
Xeroderma pigmentosum, complementation XPA E group A
Xeroderma pigmentosum, complementation XPB E group B
Xeroderma pigmentosum, complementation XPC E group C
Xeroderma pigmentosum, complementation E group D
Xeroderma pigmentosum, complementation E group E
Xeroderma pigmentosum, complementation XPF E group F
Xeroderma pigmentosum, complementation ERCC5 E group G
X-ray repair gene XRCC9 G

- 421.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 420.
- 422.A set according to claim 420 or 421 in which a minority of said probes for listed genes are absent.
- 423.A set according to claim 420 or 421 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 424.A set according to claim 420 or 421 in which a limited number of probes are replaced by probes for non-listed genes.
- 425.A set of probes for a core group of genes according to any of claims 420 to 424 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.

- 426.A set according to any of claims 420 to 425 consisting of probes for members of a sub-group of the core group.
- 427.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 428. A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 429. A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 430.A set according to claim 427 or 428 in which said substrate is a semiconductor microchip.
- 431.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 432. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 433. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 434.A medical device including a set according to any of claims 420 to 432 for use in an array for detection of differential gene expression levels.
- 435. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 420) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 420 and 422 to 432 and relating the probe hybridisation pattern to said variations.
- 436. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 421) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 421 to 432 and relating the probe interaction pattern to said variations.
- 437. Use of a set or device according to any of claims 420 to 432 for the prognosis and management of patients suffering from or at risk of experiencing the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone.
- 438.Use of a set or device according to any of claims 420 to 432 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 439. Use of a set or device according to any of claims 420 to 432 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 440. Use of a set or device according to any of claims 420 to 432 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 441. Use of a set or device according to any of claims 420 to 432 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 442. Use of a set or device according to any of claims 420 to 432 for the development of new strategies of therapeutic intervention and in clinical trials.

- 443. Use of a set or device according to any of claims 420 to 432 for construction of and generation of algorithms for patient and healthcare management.
- 444. Use of a set or device according to any of claims 420 to 432 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 445. Use of a set or device according to any of claims 420 to 432 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 446.Use of a set or device according to any of claims 420 to 432 for predicting optimum configuration/management of thereapeutic intervention.
- 447.A method according to claim 435 or 436 in which the identification of gene variants is indicative of a higher risk of developing the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone for the patient or individual.
- 448. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone, which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone;
- iii) analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 420 to 426;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone.
- 449. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 448.
- 450. A method according to any of claims 435, 436, 448 and 449 wherein at least one step is computer-controlled.
- 451. An assay suitable for use in a method according to any of claims 435, 436, 448 and 449; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 420 to 426 in a biological sample.
- 452. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 420 or 422 to 426 in a sample of human DNA;
 - ii) reagents for use in the detection process

- readout indicating the probability of a patient or individual developing the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone.
- 453. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 421 to 426 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process
 - readout indicating the probability of a patient or individual developing the symptoms and consequences of dysfunction, damage or disease of the skin, muscle, connective tissue or bone.
- 454. A set of probes according to claim 420, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 455.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to endocrine and metabolic dysfunction, damage or disease; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

METABOLIC & ENDOCRINE GENE LIST	HUGO gene symbol	Protein function
17beta hydroxysteroid dehydrogenase 1	HSD17B1	E
17beta hydroxysteroid dehydrogenase 3	HSD17B3	E
17beta hydroxysteroid dehydrogenase 4	HSD17B4	E
17beta hydroxysteroid oxidoreductase		Е
17-ketosteroid reductase		N
18-hydroxysteroid oxidoreductase		E
2,3-bisphosphoglycerate mutase	BPGM	E
2,4-dienoyl CoA reductase	DECR	Ε
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	E
3-oxoacid CoA transferase	OXCT	E

5-adenosyl homocysteine hydrolase 6-phosphofructo-2-kinase 6-pyruvoyltetrahydropterin synthase Acetoacetyl 1-CoA-thiolase Acetyl CoA acyltransferase Acetyl CoA carboxylase Acetyl CoA carboxylase alpha Acetylcholinesterase Acid phosphatase 2, lysosomal Actin, alpha, cardiac Actin, alpha, skeletal Actin, alpha, smooth, aortic Activin	PFKFB1 PTS ACAT1 ACAA ACC ACACA ACHE ACP2 ACTC ACTA1 ACTA2	
Activin A receptor, type 2B	ACVR2B	G G
Activin A receptor, type 2-like kinase 1	ACVRL1	G
Acyl CoA dehydrogenase, long chain	ACADL	E
Acyl CoA dehydrogenase, medium chain	ACADM	E
Acyl CoA dehydrogenase, short chain	ACADS	Ε
Acyl CoA dehydrogenase, very long chain	ACADVL	E
Acyl CoA synthetase, long chain, 1	LACS1	E
Acyl CoA synthetase, long chain, 2	LACS2	E
Acyl CoA synthetase, long chain, 4	ACS4	Ε
Acyl malonyl condensing enzyme	4.00	E
Adenomatous polyposis coli tumour	APC	G
supressor gene		_
Adenosine deaminase	ADA	Ē
Adenosine monophosphate deaminase	AMPD	E
Adenosine receptor A1	ADORA1	N
Adenosine receptor A2A Adenosine receptor A2B	ADORA2A	N
Adenosine receptor A3	ADORA2B ADORA3	. N
Adenyl cyclase	ADORAS	N
Adenylate cyclase 1	ADCY1	N
Adenylate cyclase 2	ADCY2	E
Adenylate cyclase 3	ADCY3	E
Adenylate cyclase 4	ADCY4	E =
Adenylate cyclase 5	ADCY5	E
Adenylate cyclase 6	ADCY6	E E
Adenylate cyclase 7	ADCY7	E
Adenylate cyclase 8	ADCY8	E
Adenylate cyclase 9	ADCY9	E
Adenylate transferase	7.5010	E
ADP-ribosyltransferase	ADPRT	E .
Adrenergic receptor, alpha1	ADRA1	N
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N
-		. 4

Adrenoleukodystrophy gene	ALD	Ε
Albumin, ALB	ALB	T
Alcohol dehydrogenase 1	ADH1	Ė
Alcohol dehydrogenase 2	ADH2	Ē
Alcohol dehydrogenase 3	ADH3	E
Alcohol dehydrogenase 4	ADH4	Ē
Alcohol dehydrogenase 5	ADH5	Ē
Alcohol dehydrogenase 6	ADH6	E
Alcohol dehydrogenase 7	ADH7	Ē
Aldehyde dehydrogenase 1	ALDH1	Ē
Aldehyde dehydrogenase 10	ALDH10	Ē
Aldehyde dehydrogenase 2	ALDH2	Ē
Aldehyde dehydrogenase 5	ALDH5	Ē
Aldehyde dehydrogenase 6	ALDH6	E
Aldehyde dehydrogenase 7	ALDH7	Ē
Aldolase A	ALDOA	E
Aldolase B	ALDOB	Ē
Aldolase C	ALDOC	Ē
Aldosterone receptor	MLR	Ğ
Alkaline phosphatase, liver/bone/kidney	ALPL	Ť
Alkylglycerone phosphate synthase	AGPS	E
Alpha 1 acid glycoprotein	AAG; AGP	, T
alpha1-antitrypsin	PI	Ε
alpha-actinin 2	ACTN2	G
alpha-actinin 3	ACTN3	G
alpha-amino adipic semialdehyde synthase		Ε
alpha-glucosidase, neutral AB	GANAB	Ε
alpha-glucosidase, neutral C	GANC	Ε
alpha-ketoglutarate dehydrogenase		E
Aminomethyltransferase	AMT	Ε
Aminopeptidase P	XPNPEP2	Ε
Amphiregulin	AREG	G
Amylo-1,6-glucosidase	AGL	E
Androgen receptor	AR	G
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	Ε
Angiotensin receptor 1	AGTR1	T
Angiotensin receptor 2	AGTR2	T
Angiotensinogen	AGT	E
Anti-Mullerian hormone	AMH	G
Anti-Mullerian hormone type 2 receptor	AMHR2	G
Apolipoprotein A I	APOA1	T
Apolipoprotein A II	APOA2	T
Apolipoprotein B	APOB	Т
Apolipoprotein C1	APOC1	Т
Apolipoprotein C2	APOC2	T
Apolipoprotein C3	APOC3	Т

Apolipoprotein D	APOD	T
Apolipoprotein E	APOE	Ť
Apolipoprotein H	APOH	Ť
Aquaporin 1	AQP1	Ť
Aquaporin 2	AQP2	T
Arginine vasopressin	AVP	N
Arginine vasopressin receptor 1A	AVPR1A	N
Arginine vasopressin receptor 1B	AVPR1B	N N
Arginine vasopressin receptor 2	AVPR2	N.
Asparagine synthetase	AS	E
Aspartate transcarbamoylase		Ē
Ataxia telangiectasia complementation group	ATD, ATDC	Ğ
D	•	J
Ataxia telangiectasia gene, AT	ATM	G
ATP cobalamin adenoxyltransferase		Ē
Atrial natriuretic peptide	ANP	Ğ
Atrial natriuretic peptide receptor A	NPR1	Ğ
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	Ğ
Attractin		Ī
Autoimmune regulator, AIRE	AIRE	1
beta-endorphin receptor		N
beta-galactosidase	GLB1	Ε
beta-ketoacyl reductase		E
Bile acid coenzyme A: amino acid N-	BAAT	E
acyltransferase		
Bile salt export pump	BSEP, PFIC2	Т
Bile salt-stimulated lipase	CEL	E
Bilirubin UDP-glucuronosyltransferase		E
Bloom syndrome protein	BLM	G
Bradykinin receptor B1		1
Bradykinin receptor B2		1
Branched chain aminotransferase 1, cytosolic	BCAT1	E
Branched chain aminotransferase 2,	BCAT2	E
mitochondrial		
Branched chain keto acid dehydrogenase E1,	BCKDHA	Ε
alpha polypeptide		
Branched chain keto acid dehydrogenase E1,	BCKDHB	" " E
beta polypeptide		
Butyrylcholinesterase	BCHE	Ε
C17-20 desmolase		E
C3 convertase		E
Calbindin 1	CALB1	G
Calbindin D9K	CALB3	G
Calcineurin A1	CALNA1	1
Calcineurin A2	CALNA2	1
Calcineurin A3	CALNA3	1
Calcineurin B		1

Calcitonin receptor /Calcitonin gene-related peptide receptor	CALCR	N
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	N
Calcium channel, voltage-dependent, alpha 1F subunit	CACNA1F	N
Calcium channel, voltage-dependent, Alpha- 1B (CACNL1A5)	CACNA1B	N
Calcium channel, voltage-dependent, Alpha-1C	CACNA1C	N
Calcium channel, voltage-dependent, Alpha- 1D	CACNA1D	N
Calcium channel, voltage-dependent, Alpha- 1E (CACNL1A6)	CACNA1E	N
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	N
Calcium channel, voltage-dependent, Beta 1	CACNB1	N
Calcium channel, voltage-dependent, Beta 3	CACNB3	. N
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	N
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	N
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	N
Calcium channel, voltage-dependent, T-type		N
Calcium sensing receptor	CASR	Т
Calmodulin 1	CALM1	G
Calmodulin 2	CALM2	G
Calmodulin 3	CALM3	G
Calmodulin-dependant protein kinase II	CAMK2A	G
Calnexin	CANX	G
Calpain	CAPN, CAPN3	E
Calretinin	CALB2	N
Canalicular multispecific organic anion transporter	CMOAT	Т
Cannabinoid receptor	CNR1	N
Carbonic anhydrase 3	CA3	Ε
Carbonic anhydrase 4	CA4	· · · · E
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	E
Carboxylesterase 1	CES1	· E
Cardiac-specific homeobox, CSX	CSX	G E
Carnitine acetyltransferase	CRAT	Ε
Carnitine acylcarnitine translocase	CACT	Ē
Carnitine palmitoutransferase I	CPT1A	E E
	CPT2	E
Carnitine transporter protein Carnosinase	CDSP, SCD	T
Camosinase	•	N

Cartilage-hair hypoplasia gene	CHH		N
Catechol-O-methyltransferase	COMT		Ε
Cell adhesion molecule, intercellular, ICAM	ICAM1		G
Cell adhesion molecule, leukocyte-	LECAM1		G
endothelial, LECAM (CD62)	LLOAMI		G
Cell adhesion molecule, liver, LCAM	LCAM		_
Cell adhesion molecule, neural, NCAM1			G
	NCAM1		G
Cell adhesion molecule, neural, NCAM120	NCAM120		G
Cell adhesion molecule, neural, NCAM2	NCAM2		G
Cell adhesion molecule, platelet-endothelial,	PECAM1		G
PECAM			
Cell adhesion molecule, vascular, VCAM	VCAM1		G
c-erbB2	ERBB2		G
c-erbB3	ERBB3		G
c-erbB4	ERBB4		G
Chitotriosidase	chit		Ε
Cholecystokinin	CCK		Ν
Cholecystokinin B receptor	CCKBR		Ν
Cholesterol ester hydroxylase			E
Cholesterol ester transfer protein	CETP		T
Choline acetyltransferase	CHAT	*	Ē
Chromogranin A	CHGA		G
Chymase	CHY1		•
Citrate synthase			E
Clathrin			T
Clusterin	CLU		Ġ
CoA transferase	020		E
Collagen IV alpha 5	COL4A5		s
Collagen IV alpha 6	COL4A6		S
Complex III	OCLANO		E
Complex V	MTATP6	•	E
Corticosteroid binding globulin	CBG		N
Corticotrophin-releasing hormone	CRH		
Corticotrophin-releasing hormone receptor			T
Cortisol receptor	CRHR1		T
Cubilin	CHON		<u> </u>
	CUBN		T
Cyclic AMP-dependent protein kinase	PKA		Ε
Cyclic nucleotide phosphodiesterase 1B	PDE1B	**	Ε
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1		Ε
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3		E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	•	Ε
Cyclic nucleotide phosphodiesterase 3B	PDE3B		Ε
Cyclic nucleotide phosphodiesterase 4A	PDE4A		Ε
Cyclic nucleotide phosphodiesterase 4C	PDE4C		Ε
Cyclic nucleotide phosphodiesterase 5A	PDE5A		Ε
Cyclic nucleotide phosphodiesterase 6A	PDE6A		E
Cyclic nucleotide phosphodiesterase 6B	PDE6B		E
Cyclic nucleotide phosphodiesterase 7	PDE7		E

Cyclic nucleotide phosphodiesterase 8 Cyclic nucleotide phosphodiesterase 9A Cyclin-dependent kinase inhibitor 1C (P57,	PDE8 PDE9A CDKN1C	E G
KIP2)		
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	G
Cyclooxygenase 1	COX1	E
Cyclooxygenase 2	COX2	E
CYP11A1	CYP11A1	E
CYP11B1	CYP11B1	Ε
CYP11B2	CYP11B2	E
CYP17	CYP17	Ε
CYP19	CYP19	E
CYP1A1	CYP1A1	E E
CYP1A2	CYP1A2	Ε
CYP1B1	CYP1B1	E
CYP21	CYP21	E
CYP24	CYP24	E
CYP27	CYP27	E
CYP27B1	PDDR	E
CYP2A1 CYP2A13	CYP2A1	E
CYP2A3	CYP2A13	Ē
CYP2A6V2	CYP2A3	E
CYP2A7	CYP2A6V2	E
CYP2B6	CYP2A7	E
CYP2C18	CYP2B6 CYP2C18	E
CYP2C19	CYP2C18 CYP2C19	E
CYP2C8	CYP2C19 CYP2C8	E
CYP2C9	CYP2C9	E E
CYP2D6	CYP2D6	E
CYP2E1	CYP2E1	E
CYP2F1	CYP2F1	E
CYP2J2	CYP2J2	Ē
CYP3A3	CYP3A3	E
CYP3A4	CYP3A4	_
CYP3A5	CYP3A5	. E
CYP3A7	CYP3A7	E
CYP4A11	CYP4A11	E
CYP4B1	CYP4B1	E
CYP4F2	CYP4F2	E
CYP4F3	CYP4F3	E
CYP51	CYP51	E
CYP5A1	CYP5A1	Ē
CYP7A	CYP7A	E
CYP8	CYP8	E
Cystathionase	CTH	E
Cystathione beta synthase	CBS	E
Cystic fibrosis transmembrane conductance	CFTR	N
	•••	1.4

regulator, CFTR		
Cystinosin	CTNS	Т
Cytidine deaminase	CDA	Ė
Cytidine-5-prime-triphosphate synthetase	CTPS	E
Cytochrome a		E
Cytochrome c		E
Cytochrome c oxidase, MTCO	•	E
Cytokine-suppressive antiinflammatory drug-	CSBP1	I
binding protein 1	332. 1	•
Cytokine-suppressive antiinflammatory drug-	CSBP2	1
binding protein 2	335. 2	'
DAX1 nuclear receptor	DAX1	. 1
D-beta-hydroxybutyrate dehydrogenase	2.5()	É
Dehydratase		E
Delta 4-5 oxosteroid isomerase		_
Delta aminolevulinate synthase 1	ALAS1	E
Delta aminolevulinate synthase 2	ALAS2	Ē
Deoxycorticosterone (DOC) receptor	7.2.102	E
Deoxyuridine triphosphatase; dUTPase		E
DHEA sulfotransferase	STD	E
Dihydrodiol dehydrogenase 1	DDH1	E
Dihydrolipoamide branched chain	DBT	N
transacylase	22.	1.4
Dihydrolipoamide dehydrogenase	DLD	N
Dihydrolipoyl dehydrogenase 2	PDHA	
Dihydrolipoyl transacetylase	PDHA	EEE
Dihydroorotase	. 21.01	_
Dihydropyramidinase	DPYS	E
Dihydroxyacetonephosphate acyltransferase	DHAPAT	Ē
Dihyropyrimidine dehydrogenase	DPYD	E
DNA glycosylases		E
DNA helicases		E
	LIG1	E
DNA methyltransferase	DNMT	E
DOPA decarboxylase	DDC	E
Dopamine beta hydroxylase	DBH	Ē
Dopamine receptors D1	DRD1	N
	DRD2	N
	DRD3	N
	DRD4	N
Dopamine receptors D5	DRD5	N
	DNM1	G
	ETFA	T
	ETFB	Ť
<u>-</u> .	ETFDH	Ė
dehydrogenase	- · - · ·	_
	EBAF	G
	ECE1	N
- ,		

Endothelin receptor type A Endothelin receptor type B Enolase Enoyl CoA reductase Enterokinase Ephrin receptor tyrosine kinase A	EDNRA EDNRB ENO1 PRSS7, ENTK EPHA	ZZEEEG
Ephrin receptor tyrosine kinase B	EPHB	G
Epidermal growth factor Epidermal growth factor receptor	EGF EGFR	G
Erythropoietin	EPO	G
Estrogen receptor	ESR	1
Excision repair complementation group 1	ERCC1	G E
protein	LINOUT	C
Factor 1 (No. one)	F1	ı
FADH dehydrogenase	• •	Ė
Fatty acid binding proteins FABP2	FABP2	T
Fc fragment of IgG, high affinity IA, receptor	FCGR1A	Ġ
for		•
Fc fragment of IgG, low affinity IIa, receptor	FCGR2A	G
for (CD32)		
Fc fragment of IgG, low affinity Illa, receptor	FCGR3A	G
for (CD16)		
Ferritin, H subunit		Т
Ferritin, L subunit	FTL	T
Fibrinogen alpha	FGA	S
Fibrinogen beta	FGB	S
Fibrinogen gamma	FGG	S
Fibroblast growth factor	FGF1	G
Fibroblast growth factor receptor 1	FGFR1	G
Fibroblast growth factor receptor 2	FGFR2	G
Fibroblast growth factor receptor 3	FGFR3	G
Flavin-containing monooxygenase 1	FMO1	Ε
Flavin-containing monooxygenase 2	FMO2	Ε
Flavin-containing monooxygenase 3	FMO3	Ε
Flavin-containing monooxygenase 4	FMO4	Ε
Follicle stimulating hormone receptor	FSHR, ODG1	G
Follicle stimulating hormone, FSH	FSHB	G
Follistatin		G
Frataxin	FRDA	G
Fructose-1,6-diphosphatase	FBP1	Ε
Fumarase	FH	Ε
Fumarylacetoacetase	FAH	Ε
GABA receptor, alpha 1	GABRA1	Ν
GABA receptor, alpha 2	GABRA2	Ν
GABA receptor, alpha 3	GABRA3	Ν
GABA receptor, alpha 4	GABRA4	N
GABA receptor, alpha 5	GABRA5	N
GABA receptor, alpha 6	GABRA6	Ν

GABA receptor, beta 2 GABA receptor, beta 3 GABA receptor, gamma 1 GABA receptor, gamma 2 GABA receptor, gamma 2 GABA receptor, gamma 3 GABA receptor, gamma 3 GABA transaminase Galactocerebrosidase Galactose 1-phosphate uridyl-transferase Galanin Galanin receptor Gamma-glutamyl carboxylase Gamma-glutamyltransferase 1 Gamma-glutamyltransferase 2 Gap junction protein beta 1 Gap junction protein beta 3 Gastric inhibitory polypeptide GIP Gastric Intrinsic factor, GIF Gastric lipase, LIPF Gastrin releasing peptide Gastrin releasing peptide Gastrin releasing peptide receptor Glucagon synthase Glucagon-like peptide receptor 1 Glucocorticoid receptor Glucosaminyl (N-acetyl) transferase 2, I-branching enzyme Glucose-6-phosphatase Glucose-6-phosphatase translocase Glucosidase, acid beta Glutamate decarboxylase, GAD Glutamate dehydrogenase	GABRB1 GABRB2 GABRB3 GABRG1 GABRG2 GABRG3 ABAT GALC GALK1 GALT GAL GALNR1 GGCX GGT1 GGT2 GJB1 GJB3 GIP GIPR GIF GAS GRP GRPR GCGR GLP1R GRL GCK GCNT2 G6PC G6PT1 G6PD GBA GAD1 GLUD1	NNNNNEEEENNTTTTTTETGTTGGEE EEEEE
Glutamate dehydrogenase Glutamine phosphoribosylpyrophosphate	GLUD1	E
amidotransferase/PRPP amidotransferase Glutamine synthase Glutathione	CSU	E
Glutathione peroxidase, GPX2	GSH GPX2	T E
Glutathione reductase, GSR	GSR	E
Glutathione S-transferase, GSTZ1	GSTZ1	Ē
Glutathione synthetase	GSS	E
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH		Ē
Glycerol kinase	GK	Ε
,	J.,	—

Glycerophosphate dehydrogenase 2 Glycinamide ribonucleotide (GAR)	GPD2 GART	E
transformylase	•	
Glycine dehydrogenase	GLDC	Ε
Glycogen branching enzyme	GBE1	E
Glycogen phosphorylase	PYGL .	E
Glycogen synthase 1 (muscle)	GLYS1	Ε
Glycogen synthase 2 (liver)	GYS2	Ε
Glycosyltransferases, ABO blood group	ABO	Ε
Gonadotropin releasing hormone	GNRH	G
Gonadotropin releasing hormone receptor	GNRHR	G
Growth arrest-specific homeobox	GAX	Ğ
Growth hormone 1	GH1	Ğ
Growth hormone 2 (placental)	GH2	Ğ
Growth hormone receptor	GHR	Ğ
Growth hormone releasing hormone (GHRH)	GHRH	G
Growth hormone releasing hormone receptor		G
GTP cylcohydrolase 1	GCH1	G
GTPase-activating protein, GAP	RASA1	G
Guanidinoacetate N-methyltransferase	GAMT	E
Guanine nucleotide-binding protein, alpha	GNAO1	N
activating activity polypeptide, GNAO	0.0.0	1.4
Guanine nucleotide-binding protein, alpha	GNAI1	N
inhibiting activity polypeptide 1, GNAI1	SIV.(1)	14
Guanine nucleotide-binding protein, alpha	GNAI2	N
inhibiting activity polypeptide 2, GNAI2	OI V (IZ	14
Guanine nucleotide-binding protein, alpha	GNAI3	N
inhibiting activity polypeptide 3, GNAI3	0.00	14
Guanine nucleotide-binding protein, alpha	GNAS1	N
stimulating activity polypeptide, GNAS1		14
Guanine nucleotide-binding protein, alpha	GNAS2	N
stimulating activity polypeptide, GNAS2	0.0.02	14
Guanine nucleotide-binding protein, alpha	GNAS3	N
stimulating activity polypeptide, GNAS3	S/1/100	1.4
Guanine nucleotide-binding protein, alpha	GNAS4	N
stimulating activity polypeptide, GNAS4	CIVICT	1.4
Guanine nucleotide-binding protein, alpha	GNAT1	N
transducing activity polypeptide, GNAT1	ONATT	IN
	GNAT2	A.I
transducing activity polypeptide, GNAT2	SIVATZ	Ν
_	GNB3	N.I
polypeptide 3	GNDS	N
	GNG5	
polypeptide 5	GNG5	N
	CNAO	
polypeptide	GNAQ	N
	CHCVan	_
Guanylate cyclase 2D, membrane (retinaspecific)	GUCY2D	Ε
specine)		

Guanylate cyclase activator 1A (retina) Guanylate kinase Guanylin Guanylyl cyclase Heat shock protein, HSP60 Heat shock protein, HSP70 Heat shock protein, HSP90 Heat shock protein, HSPA1	GUCA1A GUCA2	EETEIIII
Heat shock protein, HSPA2		ŀ
Hemopexin	HPX	-
Heparin binding epidermal growth factor Hepatic lipase	HBEGF	G
Hepatic nuclear factor-3-beta	LIPC HNF3B	E
Hepatic nuclear factor-4-alpha	HNF4A	E
Hexokinase 1	HK1	E
Hexokinase 2	HK2	E
Hexosaminidase A	HEXA,TSD	E
Hexosaminidase B	HEXB	E
Histamine receptors, H1	TIEXB	N
Histamine receptors, H2		N
Histamine receptors, H3		N
HMG-CoA lyase	HMGCL	E
HMG-CoA reductase	HMGCR	Ē
HMG-CoA synthase	HMGCS2	Ē
Holocarboxylase synthetase	HLCS	Ē
Holoprosencephaly 1	HPE1	Ğ
Holoprosencephaly 2	HPE2	Ğ
Holoprosencephaly 3	HPE3	Ğ
Holoprosencephaly 4	HPE4	Ğ
Homeobox (HOX) gene A13	HOXA13	G
Hormone-sensitive lipase	HSL	Ε
HSSB, replication protein		Ε
Human chorionic gonadtrophin, hCG	CG	G
Human placental lactogen	CSH1	G
Hydroxyacyl glutathione hydrolase	HAGH	E
Hypoxanthine-guanine	HPRT	Ε
phosphoribosyltransferase, HGPRT		
Hypoxia inducible factor 1	HIF1A · · · · · · · · · · · · · · · · · · ·	Ε
Hypoxia inducible factor 2		Ε
Iduronate 2 sulphatase	IDS	Ε
Immunoglobulin E (IgE) reponsiveness gene	IGER	-
Immunoglobulin E (IgE) serum concentration	IGES	Ţ
regulator gene	101100	
Immunoglobulin gamma (IgG) 2	IGHG2	
Indian hedgehog, ihh Inhibin, alpha	IHH	G
Inhibin, beta A	INHA	G
Inhibin, beta B	INHBA INHBB	G
minority cold b	HALIDD	G

Inhibin, beta C	INHBC	G
Inosine monophosphate dehydrogenase,		Ē
IMPDH		
Inosine triphosphatase	ITPA	E
Inositol 1,4,5-triphosphate receptor 1	ITPR1	G
Inositol monophosphatase	IMPA1	N
Inositol polyphosphate 1-phosphatase	INPP1	N
insulin	INS	G
Insulin receptor	INSR	Ğ
Insulin receptor substrate-1	IRS1	Ğ
Insulin-like growth factor 1	IGF1	Ğ
Insulin-like growth factor 1 receptor	IGF1R	Ğ
Insulin-like growth factor 2	IGF2	Ğ
Insulin-like growth factor 2 receptor	IGF2R	Ğ
Integrin beta 1	ITGB1	Ğ
Integrin beta 2	ITGB2	Ğ
Interleukin(IL) 1 receptor	IL1R	ī
Interleukin(IL) 1, alpha	IL1A	i
Interleukin(IL) 1, beta	IL1B	i
Interieukin(IL) 10	IL10	i
Interleukin(IL) 10 receptor	IL10R	İ
Interleukin(IL) 11	IL11 ·	i
Interleukin(IL) 11 receptor	IL11R	i
Interleukin(IL) 12	IL12	i
Interleukin(IL) 12 receptor, beta 1	IL12RB1	1
Interleukin(IL) 13	IL13	1
Interleukin(IL) 13 receptor	IL13R	ı
Interleukin(IL) 2	IL2	1
Interleukin(IL) 2 receptor, alpha	IL2RA	I
Interleukin(IL) 2 receptor, gamma	IL2RG	1
Interleukin(IL) 3	IL3	ł
Interleukin(IL) 3 receptor	IL3R	1
Interleukin(IL) 4	IL4	1
Interleukin(IL) 4 receptor	IL4R	i
Interleukin(IL) 5	IL5	1
Interleukin(IL) 5 receptor	IL5R	1
Interleukin(IL) 6	IL6	1
Interleukin(IL) 6 receptor	IL6R	1
Interleukin(IL) 7	IL7	1
Interleukin(IL) 7 receptor	IL7R	1
Interleukin(IL) 8	IL8	ł
Interleukin(IL) 8 receptor	IL8R	1
Interleukin(IL) 9	IL9	I
Interleukin(IL) 9 receptor	IL9R	1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	1
lodothyronine-5'-deiodinase, type 1 and 2		Ε
IP3 kinase		E
Islet amyloid polypeptide	IAPP	N

	•	
Isocitrate dehydrogenase		E
Isovaleric acid CoA dehydrogenase	IVD	E
Janus kinase 1	JAK1	G
Janus kinase 2	JAK2	G
Janus kinase 3	JAK3	G
Kallman syndrome gene 1	KAL1	G
Ketohexokinase	KHK	E
ketolase	N. II.	E
Lactase		
Lactotransferrin	LTF	E T
Laminin 5, alpha 3	LAMA3	
Laminin 5, beta 3	LAMB3	G
Laminin receptor 1	LAMR1	'G
Lecithin-cholesterol acyltransferase		G
Leptin	LCAT	E
Leptin receptor	LEP	G
Leukotriene C4 synthase	LEPR	G
LH/choriogonadotropin (CG) receptor	LTC4S	E
Lipoamide dehydrogenase	LHCGR	G
Lipoprotein lipase	OGDH	E
	LPL	1
Lipoprotein, High Density	HDLDT1	T
Lipoprotein, Intermediate Density		T
Lipoprotein, Low Density 1		T
Lipoprotein, Low Density 2	\# 5 1 5	T
Lipoprotein, Very Low Density	VLDLR	T
Lipoprotein-associated coagulation factor	LACI	1
Lipoxygenase		Ε
Lipoxygenase 12 (platelets)	LOG12	- 1
Lipoxygenase 5 (leukocytes)		1
Luteinizing hormone, beta chain	LHB	G
Lymphocyte-specific protein tyrosine kinase	LCK	1
Lysosomal acid lipase	LIPA	Ε
MAD (mothers against decapentaplegic,	MADH2	G
Drosophila) homologue 2		
Malate dehydrogenase, mitochondrial	MDH2	Ε
Malonyl CoA decarboxylase		Ε
Malonyl CoA transferase	•	Ε
Maltase-glucoamylase		Ε
Mannosidase, alpha B lysosomal	MANB	Ε
Mannosyl (alpha-1,6-)-glycoprotein beta-1, 2-	MGAT2	T
N-acetylglucosaminyltransferase	~ .	
Marenostrin	MEFV	T
Matrix Gla protein	MGP	G
MEK kinase, MEKK		E
Melanocortin 2 receptor	MC2R	Т
Melanocortin 4 receptor	MC4R	Т
Menin	MEN1	G
Methionine adenosyltransferase	MAT1A, MAT2A	E

Methionine synthase Methionine synthase reductase Methylguanine-DNA methyltransferase Methylmalonyl-CoA mutase Mitochondrial trifunctional protein, alpha	MTR MTRR MGMT MUT HADHA	E E E
subunit Mitochondrial trifunctional protein, beta subunit	HADHB	E
Molybdenum cofactor synthesis 1 Molybdenum cofactor synthesis 2 Monoamine oxidase A Monoamine oxidase B Multidrug resistance associated protein Muscarinic receptor, M1 Muscarinic receptor, M2 Muscarinic receptor, M3 Muscarinic receptor, M4 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M4 Muscarinic receptor, M3 Muscarinic receptor, M3 Muscarinic receptor, M4 Muscarinic receptor, M3 Muscarinic receptor, M3 Muscarinic receptor, M3 Muscarinic receptor, M4 Muscarinic receptor, M5 Muscarinic receptor, M4 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M5 Muscarinic receptor, M2 Muscarinic receptor, M3 Muscar	MOCS1 MOCS2 MAOA MAOB MRP CHRM1 CHRM2 CHRM3 CHRM4 CHRM5 PYGM ATP1A1 ATP1B1 ATP1B2 ATP1B3 NHE1 NHE2 NHE3 NHE4 NHE5 NAT1 NAT2 NDUFS1	E E E E G N N N N N E G G G G T T T T T E E E
NADH dehydrogenase (ubiquinone) Fe-S protein 4	NDUFS4	Ε
NADH dehydrogenase (ubiquinone) flavoprotein 1	NDUFV1	Е
NADH-cytochrome b5 reductase NADPH-dependent cytochrome P450 reductase	DIA1 POR	E E
Nephronophthisis 1 Nephrosis 1 Nerve growth factor Nerve growth factor receptor Neuraminidase sialidase Neuregulin Neuroendocrine convertase 1 Neurofibromin 1 Neurofibromin 2	NPHP1 NPHS1 NGF NGFR NEU HGL NEC1, PCSK1 NF1 NF2	T T G G T G E G

AL. CLAY	11517	
Neuropeptide Y	NPY	Ν
Neuropeptide Y receptor Y1	NPY1R	N
Neuropeptide Y receptor Y2	NPY2R	Ν
Neurotensin	NTS	Ν
Neurotensin receptor	NTSR1	N
Neurotrophin 3	NTF3 or NT3	G
Neutral endopeptidase		E
Niemann-Pick disease protein	NPC1	T
Nitric oxide synthase 1, NOS1	NOS1	Ė
Nitric oxide synthase 2, NOS2	NOS2	Ē
Nitric oxide synthase 3, NOS3	NOS3	E
Notch ligand - jagged 1	JAG1, AGS	G
Nucleoside diphosphate kinase-A	NDPKA	E
Oncogene ret	RET	
	PDGFB	G
Oncogene sis		G
Orexin	OX	G
Orexin 1 receptor	OX1R	G
Orexin 2 receptor	OX2R	G
Ornithine delta-aminotransferase	OAT	Ε
Ornithine transcarbamoylase	OTC, NME1	Ε
Oxytocin	OXT	N
Oxytocin receptor	OXTR	Ν
Paired box homeotic gene 6	PAX6	G
Paired box homeotic gene 8	PAX8	G
Palmitoyl-protein thioesterase	PPT	T
Pancreatic lipase	PNLIP	Ε
Paraoxonase PON1	PON1	Ε
Paraoxonase PON2	PON2	E.
Paraoxonase PON3		E
Parathyroid hormone	PTH	G
Parathyroid hormone receptor	PTHR1	Ğ
Parathyroid hormone related-peptide	PTHrP	Ğ
Parathyroid hormone-like hormone	PTHLH	Ğ
Peanut-like 1	PNUTL1	Ī
Peptidylglycine alpha-amidating	PAM	Ė
monooxygenase	′	-
Peroxidase, salivary	SAPX	E
Peroxisomal membrane protein 3	PXMP3	Ţ,
Peroxisome biogenesis factor 1	PEX1	
<u> </u>		T
Peroxisome biogenesis factor 19	PEX19	T
Peroxisome biogenesis factor 6	PEX6	T
Peroxisome biogenesis factor 7	PEX7	T
Peroxisome proliferative activated receptor,	PPARA	T
alpha		
Peroxisome proliferative activated receptor,	PPARG	T
gamma		
P-glycoprotein 1	PGY1	Τ
P-glycoprotein 3	PGY3	Т

PAH	E
PNMT	E
PDNP1	G
PDNP2	G
PDNP3	G
PCK1	Ε
PFKL	Е
PFKM	E
	E
GPI	E
PGK1	E
PGAM2	Ε
PLA2G10	1
PLA2G1B	ı
PLA2G2A	1
PLA2G2B	- 1
PLA2G4A	1
PLA2G4C	1
PLA2G5	i
PLA2G6	1
	1
	1
PLCD1	I
	l
PLCG1	1
PMM2	G
PMM2	Т
MPI	T
PRPS1	Ε
PHK	Ε
PHKA1	Ε
PHKA2	Ε
PHKB	E
	E
PHKG2	Ε
PHYH	G
	Ε
	Ν
PACAP1R	N
UPAR; PLAUR	S
PLAT; TPA	Ε
UPA; PLAU	Ε
	PNMT PDNP1 PDNP2 PDNP3 PCK1 PFKL PFKM GPI PGK1 PGAM2 PLA2G10 PLA2G1B PLA2G2A PLA2G2B PLA2G4A PLA2G4C PLA2G5 PLA2G6 PLCD1 PLCD1 PLCG1 PMM2 PMM2 MPI PRPS1 PHK PHKA1 PHKA2 PHKB PHKA2 PHKB PHKG2 PHYH PACAP PA

Platelet derived growth factor Platelet derived growth factor receptor Poly (ADP-ribose) synthetase Polycystin 1 Polycystin 2 Porphobilinogen deaminase Potassium inwardly-rectifying channel J1 Potassium inwardly-rectifying channel J11 Potassium voltage-gated channel A1 Potassium voltage-gated channel E1 Potassium voltage-gated channel Q1 Preproenkephalin Preproglucagon Preproglucagon Preproinsulin Profibrinolysin Progesterone receptor (RU486 binding	PDGF PDGFR PARS PKD1 PKD2 HMBS KCNJ1 KCNJ1 KCNA1 KCNA1 KCNA1 KCNE1 KCNQ1 PENK GCG;GLP1; GLP2	GGETTEXXXXXXGTTGG
receptor) Prolactin Prolactin receptor Prolactin releasing hormone Proliferin Proline dehydrogenase Proline-rich protein BstNI subfamily 1 Proline-rich protein BstNI subfamily 3 Proline-rich protein BstNI subfamily 4 Pro-melanin-concentrating hormone Proopiomelanocortin Prophet of Pit1 Prostacyclin synthase Prostaglandin (PG) D synthase,	PRL PRLR PRH PLF PRODH PRB1 PRB3 PRB4 PMCH POMC PROP1 PGDS	0 0 0 0 E 8 8 8 6 Z 6 - E
hematopoietic Prostaglandin 15-OH dehydrogenase Prostaglandin D - DP receptor Prostaglandin E1 receptor Prostaglandin E2 receptor Prostaglandin E3 receptor Prostaglandin F - FP receptor Prostaglandin I2 receptor Prostaglandin IP receptor Prostaglandin iP receptor Prostaglandin isomerase Prostasin, PRSS8 Protease nexin 2 Protein kinase B Protein kinase C, alpha Protein S Protoporphyrinogen oxidase Pterin-4-alpha-carbinolamine	PRSS8 PN2 PRKB PRKCA PROS1 PPOX PCBD	IIIIIII BEE EIE

Pyrroline-5-carboxylate synthetase	PYCS	E
Pyruvate carboxylase	PC	E
Pyruvate decarboxylase	PDHA	Ε
Pyruvate kinase	PKLR	Ε
Quinoid dihydropteridine reductase	QDPR	Ε
Rathke pouch homeobox, RPX	RPX	G
Relaxin H1	RLN1	G
Relaxin H2	RLN2	G
Renin	REN	Ε
Replication factor C	· RFC2	Ε
Retinal pigment epithelium specific protein	RPE65	S
(65kD)		
Retinaldehyde binding protein 1	RLBP1	Т
Retinoic acid receptor, alpha	RARA	G
Retinoic acid receptor, beta	RARB	G
Retinoic acid receptor, gamma	RARG	G
Retinoid X receptor, alpha	RXRA	G
Retinoid X receptor, beta	RXRB	G
Retinoid X receptor, gamma	RXRG	G
Retinol binding protein 1		T
Retinol binding protein 2		Т
Ribosephosphate pyrophosphokinase		Ε
RIGUI	RIGUI	G
Ryanodine receptor 1, skeletal	RYR1	G
S100 calcium-binding protein A1	S100A1	N
S100 calcium-binding protein A2	S100A2	Ν
S100 calcium-binding protein A3	S100A3	N
S100 calcium-binding protein A4	S100A4	Ν
S100 calcium-binding protein A5	S100A5	N -
S100 calcium-binding protein A6	S100A6	Ν
S100 calcium-binding protein A7	S100A7	Ν
S100 calcium-binding protein A8	S100A8	Ν
S100 calcium-binding protein A9	S100A9	Ν
S100 calcium-binding protein B	S100B	Ν
S100 calcium-binding protein P	S100P	Ν
S-adenosylmethionine decarboxylase, AMD		Ε
Salivary amylase, AMY1		T
Secretin	SCT	Ţ,
Secretin receptor, SCTR	SCTR	T
Serine hydroxymethyltransferase	SHMT	Ε
Serotonin N-acetyltransferase	SNAT	Ε
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C	Ν
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	Ν
Serotonin receptor, 5HT2A	HTR2A	Ν

Serotonin receptor, 5HT2B	HTR2B	N
Serotonin receptor, 5HT2C	HTR2C	N
Serotonin receptor, 5HT3	HTR3	
Serotonin receptor, 5HT4	HTR4	N
Serotonin receptor, 5HT5	HTR5	N
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7		N
Serum amyloid A	HTR7	N
Serum amyloid P	SAA	T
	SAP	Т
Sex determining region Y, SRY	SRY	G
Sex hormone binding globulin, SHBG		Т
Sodium channel, non-voltage gated 1, alpha	SCNN1A	Ν
Sodium channel, non-voltage gated 1, beta	SCNN1B	Ν
Sodium channel, non-voltage gated 1,	SCNN1G	N
gamma		
Sodium channel, voltage-gated, type 1, beta	SCN1B	Ν
polypeptide		
Solute carrier family 1 (amino acid	SLC1A6	T
transporter), member 6		
Solute carrier family 1 (neutral amino acid	SLC1A4	Т
transporter), member 4		•
Solute carrier family 10 (sodium/bile acid	SLC10A1	Т
cotransporter family),member 1	320 (3/)	'
Solute carrier family 10 (sodium/bile acid	SLC10A2	Т
cotransporter family),member 2	020 TO/12	•
Solute carrier family 12, member 1	SLC12A1	Т
Solute carrier family 12, member 2	SLC12A2	Ť
Solute carrier family 12, member 3	SLC12A3	
Solute carrier family 14, member 2	SLC14A2	T
Solute carrier family 15 (H+/peptide		Ţ
transporter, intestinal), member 1	SLC15A1	T
Solute carrier family 15 (H+/peptide	CI 04540	_
transporter, kidney), member 2	SLC15A2	T
	01.04044	_
Solute carrier family 16 (monocarboxylate	SLC16A1	T
transporter), member 1	01.0404	
Solute carrier family 16 (monocarboxylate	SLC16A7	Τ
transporter), member 7		
Solute carrier family 17, member 1	SLC17A1	T
Solute carrier family 17, member 2	SLC17A2	T
Solute carrier family 2 (facilitated glucose	SLC2A1	Т
transporter), member 1		
Solute carrier family 2 (facilitated glucose	SLC2A2	Т
transporter), member 2		
Solute carrier family 2 (facilitated glucose	SLC2A3	Т
transporter), member 3		•
Solute carrier family 2 (facilitated glucose	SLC2A4	Т
transporter), member 4	· ·	•
Solute carrier family 2 (facilitated glucose	SLC2A5	т
		Т

transporter), member 5		
Solute carrier family 20, member 3	SLC20A3	Т
Solute carrier family 21, member 2	SLC21A2	Ť
Solute carrier family 21, member 3	SLC21A3	Ţ
Solute carrier family 22, member 1	SLC22A1	Ť
Solute carrier family 22, member 2	SLC22A2	Ť
Solute carrier family 22, member 5	SLC22A5	· T
Solute carrier family 3 (facilitated glucose	SLC3A1	Ť
transporter), member 1		·
Solute carrier family 4 (anion exchanger),	SLC4A1	Т
member 1		·
Solute carrier family 4 (anion exchanger),	SLC4A2	Т
member 2	•	•
Solute carrier family 4 (anion exchanger),	SLC4A3	Т
member 3		•
Solute carrier family 5 (sodium/glucose	SLC5A1	. т
transporter), member 1	•	•
Solute carrier family 5 (sodium/glucose	SLC5A2	Т
transporter), member 2		•
Solute carrier family 5 (sodium/glucose	SLC5A5	Т
transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	Т
Solute carrier family 6 (GAMMA-	SLC6A1	T
AMINOBUTYRIC ACID transporter), member		
1		
Solute carrier family 6 (neurotransmitter	SLC6A3	Т
transporter, dopamine), member 3		
Solute carrier family 6 (neurotransmitter	SLC6A2	Т
transporter, noradrenaline), member 2		
Solute carrier family 6 (neurotransmitter	SLC6A4	Т
transporter, serotonin), member 4		
Solute carrier family 6, member 10	SLC6A10	Ŧ
Solute carrier family 6, member 6	SLC6A6	Т
Solute carrier family 6, member 8	SLC6A8	• Т
Solute carrier family 7(amino acid	SLC7A1	Т
transporter), member 1		
Solute carrier family 7(amino acid	SLC7A2	Т
transporter), member 2	* * * * * *	* * * *
Solute carrier family 7(amino acid	SLC7A7	• Т
transporter), member 7		
Solute carrier family 8 (sodium/calcium	SLC8A1	T
exchanger), member 1		
Somatostatin	SST	N
Somatostatin receptor, SSTR1	SSTR1	N
Somatostatin receptor, SSTR2	SSTR2	G
Somatostatin receptor, SSTR3	SSTR3	N
Somatostatin receptor, SSTR4	SSTR4	N.
Somatostatin receptor, SSTR5	SSTR5	N

•		
Somatotrophin		G
Sorcin	SRI	T
SOS1 guanine nucleotide exchange factor	SOS1	Ġ
Sperm protamine P1	PRM1	Ğ
Sperm protamine P2	PRM2	Ğ
Sphingomyelinase	SMPD1	Ē
SRY-box 10	SOX10	Ğ
SRY-box 11	SOX11	Ğ
SRY-box 3	SOX3	G
SRY-box 4	SOX4	G
SRY-box 9	SOX9	G
Steroid sulphatase	STS	E
Steroidogenic acute regulatory protein	STAR	T
Substance P	3.7.11	N
Succinyl CoA synthase		E
Sucrase	•	E
Sulfonylurea receptor	SUR	G
Superoxide dismutase 1	SOD1	E
Superoxide dismutase 3	SOD3	E
Surfeit 1	SURF1	G
T-BOX 1	TBX1	G
T-BOX 3	TBX3	G
Thiolase, perioxisomal	1570	E
Thiopurine S-methyltransferase	TPMT	E
Thrombospondin	THBS1	
Thromboxane A synthase 1	TBXAS1	G
Thromboxane A2	TXA2	1
Thromboxane A2 receptor	TBXA2R	1
Thymopoietin	TMPO	1
Thymosin	TIVII-O	G
Thyroglobulin	TG	
Thyroid hormone receptor, alpha	THRA	G
Thyroid hormone receptor, beta	THRB	G
Thyroid peroxidase	TPO	G
Thyroid receptor auxiliary protein	TRAP	G
Thyroid-stimulating hormone receptor	TSHR	G
Thyroid-stimulating hormone, alpha	TSHA	G
Thyroid-stimulating hormone, beta	TSHB	G
Thyrotropin releasing hormone	TRH	G
Thyrotropin releasing hormone receptor		G
Thyroxin-binding globulin	TRHR	G
Transacylase	TBG	T
Transacylase Transcobalamin 2, TCN2	TONO	Ε
Transcobalarilit 2, 10/12 Transcription factor 1, hepatic	TCN2	T
Transcription factor 1, hepatic Transcription factor 2, hepatic	TCF1	G
Transcription factor 2, nepatic Transcription termination factor, RNA	TCF2	G
polymerase 1	TTF1	G
Transferrin	TE	_
Franciel IIII	TF	G

TFRC	G
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UBE3A	E
	Ē
ugt1d, UGT1	Ē
UGT2	Ē
	T
UCP3	T
UOX	E
	Ē
UMPK	1
UMPS].
GALE	Ε
UROD	E
UGB	Т
VIP	N
VIPR	Ν
•	G
VHL	G
WRN	G
WFS1	G S
•	E
	UCP3 UOX UMPK UMPS GALE UROD UGB VIP VIPR VHL WRN

456.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 455.

^{457.}A set according to claim 455 or 456 in which a minority of said probes for listed genes are absent.

- 458.A set according to claim 455 or 456 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 459.A set according to claim 455 or 456 in which a limited number of probes are replaced by probes for non-listed genes.
- 460.A set of probes for a core group of genes according to any of claims 455 to 459 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 461.A set according to any of claims 455 to 460 consisting of probes for members of a sub-group of the core group.
- 462.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 463 A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 464.A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 465.A set according to claim 462 or 463 in which said substrate is a semiconductor microchip.
- 466.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 467. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 468. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 469.A medical device including a set according to any of claims 455 to 467 for use in an array for detection of differential gene expression levels.
- 470. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 455) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 455 and 457 to 467 and relating the probe hybridisation pattern to said variations.
- 471. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 456) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 456 to 467 and relating the probe interaction pattern to said variations.
- 472. Use of a set or device according to any of claims 455 to 467 for the prognosis and management of patients suffering from or at risk of experiencing the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease.
- 473. Use of a set or device according to any of claims 455 to 467 for predicting likely therapeutic response and adverse events following therapeutic intervention.

- 474. Use of a set or device according to any of claims 455 to 467 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 475. Use of a set or device according to any of claims 455 to 467 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 476. Use of a set or device according to any of claims 455 to 467 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 477. Use of a set or device according to any of claims 455 to 467 for the development of new strategies of therapeutic intervention and in clinical trials.
- 478. Use of a set or device according to any of claims 455 to 467 for construction of and generation of algorithms for patient and healthcare management.
- 479. Use of a set or device according to any of claims 455 to 467 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 480. Use of a set or device according to any of claims 455 to 467 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 481. Use of a set or device according to any of claims 455 to 467 for predicting optimum configuration/management of thereapeutic intervention.
- 482.A method according to claim 470 or 471 in which the identification of gene variants is indicative of a higher risk of developing the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease, for the patient or individual.
- 483. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease, which method comprises:
- obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease;
- obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease;
- iii) analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 455 to 461;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease.
- 484. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 483.
- 485. A method according to any of claims 470, 471, 483 and 484 wherein at least one step is computer-controlled.

- 486. An assay suitable for use in a method according to any of claims 470, 471, 483 and 484; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 455 to 461 in a biological sample.
- 487. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 455 or 457 to 461 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease.
- 488. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 456 to 461 in an expressed-protein-containing human sample;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing the symptoms and consequences of endocrine and metabolic dysfunction, damage or disease.
- 489. A set of probes according to claim 455, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 490.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to headaches; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

HEADACHE GENE LIST

HUGO gene symbol

Protein function

Acetylcholinesterase	ACHE	Ε
Adenylate cyclase 1	ADCY1	Ε
Adenylate cyclase 2	ADCY2	
Adenylate cyclase 3	ADCY3	E
Adenylate cyclase 4	ADCY4	Ε
Adenylate cyclase 5	ADCY5	Ε
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	Ε
Adenylate cyclase 8	ADCY8	Ε
Adenylate cyclase 9	ADCY9	Ε
Adrenergic receptor, alpha1	ADRA1	Ν
Adrenergic receptor, alpha2	ADRA2	Ν
Adrenergic receptor, beta1	ADRB1	Ν
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	Ν
Angiopoietin 1	ANGPT1	G
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	Ε
Angiotensin receptor 1	AGTR1	T
Angiotensin receptor 2	AGTR2	Τ
Angiotensinogen	AGT	Ε
Arginase	ARG1	Ε
Arginine vasopressin	AVP	Ν
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
Calcitonin/Calcitonin gene-related peptide	CALCA	Ν
alpha	0.00.45	
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	Ν
subunit	0101145	
Calcium channel, voltage-dependent, Alpha-	CACNA1B	Ν
1B (CACNL1A5)	0101110	
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C	CACNAID	
Calcium channel, voltage-dependent, Alpha- 1D	CACNA1D	Ν
	CACNA1F	
Calcium channel, voltage-dependent, Alpha- 1E (CACNL1A6)	CACNA1E ** *	Ν
Calcium channel, voltage-dependent, Alpha-	CACNA2	N.I.
2/delta	CACINAZ	Ν
Calcium channel, voltage-dependent, Beta 1	CACNE1	N.I.
Calcium channel, voltage-dependent, Beta 3	CACNB1 CACNB3	N
Calcium channel, voltage-dependent, beta s Calcium channel, voltage-dependent,	CACNG2	N
Neuronal, Gamma	ONUNGZ	N
Calcium channel, voltage-dependent, P/Q	CACNA1A	NI
type, alpha 1A subunit	UNUNAIA	N
Calcium channel, voltage-dependent, T-type		N.I
-aloram orialmor, voltage-dependent, 1-type		Ν

Calnexin	CANX	•
Cannabinoid receptor		G
Carbonic anhydrase 3	CNR1	N
•	CA3	E
Carbonic anhydrase 4	CA4	E
Carbonic anhydrase, alpha	CA1	E
Carbonic anhydrase, beta	CA2	Ε
Catechol-O-methyltransferase	COMT	E
Choline acetyltransferase	CHAT	. E
Cyclic AMP-dependent protein kinase	PKA	Ε
Cyclic nucleotide phosphodiesterase 1B	PDE1B	Ε
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	Ε
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	E E
Cyclic nucleotide phosphodiesterase 3A	PDE3A	Ε
Cyclic nucleotide phosphodiesterase 3B	PDE3B	E
Cyclic nucleotide phosphodiesterase 4A	PDE4A	Ε
Cyclic nucleotide phosphodiesterase 4C	PDE4C	· E
Cyclic nucleotide phosphodiesterase 5A	PDE5A	Ē
Cyclic nucleotide phosphodiesterase 6A	PDE6A	Ē
Cyclic nucleotide phosphodiesterase 6B	PDE6B	Ē
Cyclic nucleotide phosphodiesterase 7	PDE7	Ē
Cyclic nucleotide phosphodiesterase 8	PDE8	Ē
Cyclic nucleotide phosphodiesterase 9A	PDE9A	Ē
Cyclooxygenase 1	COX1	Ē
Cyclooxygenase 2	COX2	Ē
CYP11A1	CYP11A1	Ē
CYP11B1	CYP11B1	Ē
CYP11B2	CYP11B2	Ē
CYP17	CYP17	Ē
CYP19	CYP19	Ē
CYP1A1	CYP1A1	Ē
CYP1A2	CYP1A2	Ē
CYP1B1	CYP1B1	E
CYP21	CYP21	Ē
CYP24	CYP24	Ē
CYP27	CYP27	<u> </u>
CYP27B1	PDDR	E E
CYP2A1	CYP2A1	E
CYP2A13	CYP2A13	E
CYP2A3	CYP2A3	
CYP2A6V2	CYP2A6V2	E
CYP2A7	CYP2A6V2	E
CYP2B6		E.
CYP2C18	CYP2B6	E
CYP2C19	CYP2C18	E
CYP2C8	CYP2C19	E
CYP2C9	CYP2C8	E
CYP2D6	CYP2C9	E
CYP2E1	CYP2D6	Ē
CIFZEI	CYP2E1	Ε

Cytidine de Cytidine-5 Cytochrom Cytochrom Cytochrom Cytokine-s binding pro Cytokine-s binding pro Dopamine Endothelin	te beta synthase eaminase -prime-triphosphate synthetase ne a ne c ne c oxidase, MTCO suppressive antiinflammatory drug- otein 1 suppressive antiinflammatory drug- otein 2 beta hydroxylase receptors D1 receptors D2 receptors D3 receptors D4 receptors D5 1 2 3 converting enzyme receptor type A receptor type B growth factor growth factor growth factor receptor etin receptor etin receptor etin synthase	CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP5A1 CYP7A CYP8 CTH CBS CTPS CSBP1 CSBP2 DBH DRD1 DRD2 DRD3 DRD4 DRD5 CSE EDN1 EDN2 EDN3 ECN1 EDNRA EDNRB ENO1 EGF EGFR EGFR GSH GSTZ1	ШШШШШШШШШШШШШШШШШ — ШХХХХХХХХХХХХДШОО—↑ Ш
Glutathione Glutathione Glyceralde GAPDH Glycerol kir	e e S-transferase, GSTZ1 hyde-3-phosphate dehydrogenase, nase	GSH GSTZ1 GAPDH GK	T E E
Grycinariio	le ribonucleotide (GAR)	GART	E

transformylase		
Hexosaminidase B	HEXB	Ε
Histamine receptors, H1		N
Histamine receptors, H2		N
Histamine receptors, H3	• .	N
Hypoxia inducible factor 1	HIF1A	Ε
Hypoxia inducible factor 2	•	Ε
Insulin	INS	G
Insulin receptor	INSR	G
Interleukin(IL) 1, alpha	iL1A ·	1
Interleukin(IL) 1, beta	IL1B	1
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	1
IP3 kinase		Ε
Marenostrin	MEFV	Т
Methylmalonyl-CoA mutase	MUT	Ε
Monoamine oxidase A	MAOA	Ε
Monoamine oxidase B	MAOB	Ε
Muscarinic receptor, M1	CHRM1	Ν
Muscarinic receptor, M2	CHRM2	Ν
Muscarinic receptor, M3		Ν
Muscarinic receptor, M4		N
Muscarinic receptor, M5		N
Myogenic factor 3		G
Myogenic factor 4		Ğ
Myogenic factor 5		G
NADH dehydrogenase		Ε
NADPH-dependent cytochrome P450		Ε
reductase		
Neurokinin A	NKNA ·	Ν
Neurokinin B	NKNB	Ν
Neuropeptide Y	NPY	Ν
Neuropeptide Y receptor Y1	NPY1R	Ν
Neuropeptide Y receptor Y2	NPY2R	Ν
Nitric oxide synthase 1, NOS1	NOS1	Ε
Nitric oxide synthase 2, NOS2	NOS2	Ε
Nitric oxide synthase 3, NOS3	NOS3	Ε
Phospholipase A2, group 10	PLA2G10	ı
Phospholipase A2, group 1B	PLA2G1B	ľ
Phospholipase A2, group 2A	PLA2G2A	1
Phospholipase A2, group 2B	PLA2G2B	1
Phospholipase A2, group 4A	PLA2G4A	1
Phospholipase A2, group 4C	PLA2G4C	ı
Phospholipase A2, group 5	PLA2G5	1
Phospholipase A2, group 6	PLA2G6	1
Phospholipase C alpha		1
Phospholipase C beta		ı
Phospholipase C delta	PLCD1	Į
Phospholipase C epsilon	•	ı

Phospholipase C gamma		PLCG1		ı
Potassium inwardly-rectifyin	g channel J1	KCNJ1		N
Potassium voltage-gated ch	annel E1	KCNE1		N
Potassium voltage-gated ch	annel Q1	KCNQ1		N
Proopiomelanocortin		POMC	7	N
RIGÜI		RIGUI		G
Serotonin receptor, 5HT1A		HTR1A		Ň
Serotonin receptor, 5HT1B		HTR1B	•	N
Serotonin receptor, 5HT1C		HTR1C		N
Serotonin receptor, 5HT1D		HTR1D		N
Serotonin receptor, 5HT1E		HTR1E		N
Serotonin receptor, 5HT1F	•	HTR1F		N
Serotonin receptor, 5HT2A		HTR2A		N
Serotonin receptor, 5HT2B		HTR2B		Ν
Serotonin receptor, 5HT2C	•	HTR2C	•	N
Serotonin receptor, 5HT3		HTR3		N
Serotonin receptor, 5HT4		HTR4		N
Serotonin receptor, 5HT5		HTR5		N
Serotonin receptor, 5HT6		HTR6		N
Serotonin receptor, 5HT7		HTR7		N
Sodium channel, non-voltage	e gated 1, alpha	SCNN1A		Ν
Sodium channel, non-voltage	e gated 1, beta	SCNN1B		Ν
Sodium channel, non-voltage	e gated 1, gamma	SCNN1G		Ν
Sodium channel, voltage-ga	ted, type 1, beta	SCN1B		Ν
polypeptide				
Solute carrier family 5, mem		SLC5A3		T
Solute carrier family 6 (GAM		SLC6A1		T
AMINOBUTYRIC ACID trans				
Solute carrier family 6 (neuro		SLC6A3		Т
transporter, dopamine), men				
Solute carrier family 6 (neuro		SLC6A2		Т
transporter, noradrenaline), i	member 2			
Substance P				N
Tyrosine hydroxylase		TH		Ε
UDP-glucuronosyltransferas		ugt1d, UGT1		Ε
UDP-glucuronosyltransferas		UGT2		Ε
Vasoactive intestinal polyper		VIP		Ν
Vasoactive intestinal polyper	otide receptor	VIPR:	٠, ١	N

491.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions. small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 490.

- 492.A set according to claim 490 or 491 in which a minority of said probes for listed genes are absent.
- 493.A set according to claim 490 or 491 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 494.A set according to claim 490 or 491 in which a limited number of probes are replaced by probes for non-listed genes.
- 495. A set of probes for a core group of genes according to any of claims 490 to 494 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.
- 496.A set according to any of claims 490 to 495 consisting of probes for members of a sub-group of the core group.
- 497. A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 498.A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 499. A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 500.A set according to claim 497 or 498 in which said substrate is a semiconductor microchip.
- 501.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- 502. A set according to any preceding claim for use in the measurement of differential gene expression levels.
- 503. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 504.A medical device including a set according to any of claims 490 to 502 for use in an array for detection of differential gene expression levels.
- 505. A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 490) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 490 and 492 to 502 and relating the probe hybridisation pattern to said variations.
- 506. A method for use in assessing the the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 491) in a target group of genes by interacting an expressed-protein-containing sample from said patient or individual with a set of probes according to any of claims 491 to 502 and relating the probe interaction pattern to said variations.
- 507. Use of a set or device according to any of claims 490 to 502 for the prognosis and management of patients suffering from or at risk of developing a headache.

- 508.Use of a set or device according to any of claims 490 to 502 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 509. Use of a set or device according to any of claims 490 to 502 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- 510. Use of a set or device according to any of claims 490 to 502 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- 511. Use of a set or device according to any of claims 490 to 502 for general health screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 512. Use of a set or device according to any of claims 490 to 502 for the development of new strategies of therapeutic intervention and in clinical trials.
- 513. Use of a set or device according to any of claims 490 to 502 for construction of and generation of algorithms for patient and healthcare management.
- 514. Use of a set or device according to any of claims 490 to 502 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations.
- 515. Use of a set or device according to any of claims 490 to 502 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 516. Use of a set or device according to any of claims 490 to 502 for predicting optimum configuration/management of thereapeutic intervention.
- 517. A method according to claim 505 or 506 in which the identification of gene variants is indicative of a higher risk of developing a headache for the patient or individual.
- 518. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop a headache, which method comprises:
- i) obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from headaches;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the headaches;
- iii) analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 490 to 496;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing a headache.
- 519. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 518.
- 520. A method according to any of claims 505, 506, 518 and 519 wherein at least one step is computer-controlled.
- 521. An assay suitable for use in a method according to any of claims 505, 506, 518 and 519; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 490 to 496 in a biological sample.

- 522. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing a headache; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 490 or 492 to 496 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - ii) readout indicating the probability of a patient or individual developing a headache.
- 523. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing a headache; said kit comprising:
 - means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core group of genes as defined in any of claims 491 to 496 in an expressedprotein-containing human sample;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing a headache.
- 524. A set of probes according to claim 490, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.
- 525.A set of nucleotide probes for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes which relate to sexual dysfunction; said probes being complementary to DNA and RNA sequences of said group of genes; characterised in that said group is a core group of genes consisting of substantially all of the following:

KEY TO 'PROTEIN FUNCTION' COLUMN

- E ENZYME
- T TRANSPORT & STORAGE
- S STRUCTURAL
- I IMMUNITY
- N NERVOUS TRANSMISSION
- G GROWTH & DIFFERENTIATION

HUGO gene symbol	Protein function
HSD11B2	Ε
ACHE	Ε
	G
ADCY1	E
ADCY2	Ε
ADCY3	Ε
ADCY4	E
ADCY5	E
	symbol HSD11B2 ACHE ADCY1 ADCY2 ADCY3 ADCY4

•		
Adenylate cyclase 6	ADCY6	Ε
Adenylate cyclase 7	ADCY7	Ε
Adenylate cyclase 8	ADCY8	Ε
Adenylate cyclase 9	ADCY9	Ε
Adrenergic receptor, alpha1	ADRA1	Ν
Adrenergic receptor, alpha2	ADRA2	N
Adrenergic receptor, beta1	ADRB1	N
Adrenergic receptor, beta2	ADRB2	N
Adrenergic receptor, beta3	ADRB3	N
Adrenoleukodystrophy gene	ALD	Ε
alpha thalassemia gene	ATRX	N
Androgen binding protein	ABP	Т
Angiopoietin 1	ANGPT1	Ġ
Angiopoietin 2	ANGPT2	G
Angiotensin converting enzyme	ACE, DCP1	E
Angiotensin receptor 1	AGTR1	Т
Angiotensin receptor 2	AGTR2	T
Angiotensinogen	AGT .	E
Anti-Mullerian hormone	AMH	G
Anti-Mullerian hormone type 2 receptor	AMHR2	G
Arginase	ARG1	E
Arginine vasopressin	AVP	N
Arginine vasopressin receptor 1A	AVPR1A	N
Arginine vasopressin receptor 1B	AVPR1B	Ν
Arginine vasopressin receptor 2	AVPR2	Ν
Atrial natriuretic peptide	ANP	G
Atrial natriuretic peptide receptor A	NPR1	G
Atrial natriuretic peptide receptor B	NPR2	G
Atrial natriuretic peptide receptor C	NPR3	G
Autoimmune regulator, AIRE	AIRE	1
BCL2-associated X protein	BAX	G
Bloom syndrome protein	BLM	G
Calcium channel, voltage-dependent, alpha 1F	CACNA1F	Ν
subunit		
Calcium channel, voltage-dependent, Alpha-	CACNA1B	Ν
1B (CACNL1A5)		
Calcium channel, voltage-dependent, Alpha-	CACNA1C	Ν
1C ***	er komplet en en en en	
Calcium channel, voltage-dependent, Alpha-	CACNA1D	Ν
1D		
Calcium channel, voltage-dependent, Alpha-	CACNA1E	Ν
1E (CACNL1A6)		
Calcium channel, voltage-dependent, Alpha-	CACNA2	Ν
2/delta		
Calcium channel, voltage-dependent, Beta 1	CACNB1	Ν
Calcium channel, voltage-dependent, Beta 3	CACNB3	Ν
Calcium channel, voltage-dependent,	CACNG2	Ν
Neuronal, Gamma		
•		

Calcium channel, voltage-dependent, T-type			N
Carbonic anhydrase 3	CA3		_
Carbonic anhydrase 4	CA4		Ē
Carbonic anhydrase, alpha	CA1		E
Carbonic anhydrase, beta	CA2		F
Catechol-O-methyltransferase	COMT		E E
Choline acetyltransferase	CHAT		_ =
Cyclic AMP response element modulator	CREM		G
Cyclic AMP-dependent protein kinase	PKA		E
Cyclic nucleotide phosphodiesterase 1B	PDE1B		E
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1		_
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3		E
Cyclic nucleotide phosphodiesterase 3A	PDE3A		E
Cyclic nucleotide phosphodiesterase 3B	PDE3B		E
Cyclic nucleotide phosphodiesterase 4A	PDE4A		E
Cyclic nucleotide phosphodiesterase 4C	PDE4C		_
Cyclic nucleotide phosphodiesterase 5A	PDE5A		E E
Cyclic nucleotide phosphodiesterase 6A	PDE6A		_
Cyclic nucleotide phosphodiesterase 6B	PDE6B		E
Cyclic nucleotide phosphodiesterase 7	PDE7		E
Cyclic nucleotide phosphodiesterase 8	PDE8		E
Cyclic nucleotide phosphodiesterase 9A	PDE9A		E
Cyclooxygenase 1	COX1		E
Cyclooxygenase 2	COX2		E
CYP11A1	CYP11A1		E
CYP11B1	CYP11B1		Ē
CYP11B2	CYP11B2		Ē
CYP17	CYP17		Ē
CYP19	CYP19		Ē
CYP1A1	CYP1A1		Ε
CYP1A2	CYP1A2		Ε
CYP1B1	CYP1B1		Ε
CYP21	CYP21		Ε
CYP24	CYP24		E,
CYP27	CYP27		E
CYP27B1	PDDR		Ε
CYP2A1	CYP2A1		E
CYP2A13	CYP2A13	200 2 2 2 E	E
CYP2A3	CYP2A3		E
CYP2A6V2	CYP2A6V2		Ε
CYP2A7	CYP2A7		Ε
CYP2B6	CYP2B6		Ε
CYP2C18	CYP2C18		Ε
CYP2C19	CYP2C19		Ε
CYP2C8	CYP2C8		Ε
CYP2C9	CYP2C9		Ε
CYP2D6	CYP2D6		Ε
CYP2E1	CYP2E1		Ε

CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP5A1 CYP5A1 CYP5A1 CYP5A2 CYP5A1 CYP5A2 CYP5A2 CYP5A3 CYP5A3 CYP5A3 CYP5A3 CYP5A3 CYP5A3 CYP5A4 CYP5A4 CYP8 Cystathionase Cystathionase Cystathionase Cystathionase Cytochrome a cytochrome a Cytochrome c cytochrome c oxidase, MTCO Cytokine-suppressive antiinflammatory drug-	CYP2F1 CYP2J2 CYP3A3 CYP3A4 CYP3A5 CYP3A7 CYP4A11 CYP4B1 CYP4F2 CYP4F3 CYP51 CYP5A1 CYP7A CYP8 CTH CBS CDA CTPS	
binding protein 1		•
Cytokine-suppressive antiinflammatory drugbinding protein 2	CSBP2	. 1
DAX1 nuclear receptor	DAX1	Ī
Deleted in azoospermia	DAZ	G
Diaphanous 2	DIAPH2	Ν
Disrupted meiotic cDNA 1, homolog	DMC1	G
Dopamine beta hydroxylase	DBH	Ε
Dopamine receptors D1	DRD1	N
Dopamine receptors D2	DRD2	N
Dopamine receptors D3	DRD3	N
Dopamine receptors D4	DRD4	N
Dopamine receptors D5	DRD5	N
Electron-transfering-flavoprotein alpha	ETFA	<u>T</u>
Electron-transfering-flavoprotein beta	ETFB	T
Electron-transferring flavoprotein dehydrogenase	ETFDH	E-
Endometrial bleeding-associated factor	EBAF	G
Endothelin 1	EDN1	N
Endothelin 2	EDN2	N
Endothelin 3	EDN3	N
Endothelin converting enzyme	ECE1	N
Endothelin receptor type A	EDNRA	N
Endothelin receptor type B	EDNRB	N
Enolase	ENO1	Ë
Enoyl CoA isomerase		Ē
- -		-

Enterokinase	PRSS7, ENTK	E
Epidermal growth factor	EGF	G
Epidermal growth factor receptor	EGFR	G
Faciogenital dysplasia	FGD1, FGDY	Т
Factor XIII A & B	F13A & F13B	Ī
Fanconi anemia, complementation group A	FANCA	T
Fertilin protein	FTNB	Ġ
Flightless-II, Drosophila homolog of	FLII	Ğ
Folic acid receptor	FOLR	G
Glutathione	GSH	T
Glutathione S-transferase, GSTZ1	GSTZ1	Ė
Glyceraldehyde-3-phosphate dehydrogenase,	GAPDH	E
GAPDH GAPDH	O/ 11 21 1	_
Glycerol kinase	GK	E
Glycinamide ribonucleotide (GAR)	GART	E
transformylase	C/A/Y	_
Glycogen phosphorylase	PYGL	Ε
Gonadotropin releasing hormone	GNRH	G
Gonadotropin releasing hormone receptor	GNRHR	G
Guanine nucleotide-binding protein, alpha	GNAI1	N
inhibiting activity polypeptide 1, GNAI1	ONAH	IN
Guanine nucleotide-binding protein, alpha	GNAI2	N
inhibiting activity polypeptide 2, GNAI2	GIVAIZ	IN
Guanine nucleotide-binding protein, alpha	GNAI3	N.I
inhibiting activity polypeptide 3, GNAI3	GIVAIS	N
Hexosaminidase B	HEXB	_
Holoprosencephaly 1	HPE1	E G
Holoprosencephaly 2	HPE2	G
Holoprosencephaly 3	HPE3	
Holoprosencephaly 4	HPE4	G
Human placental lactogen	CSH1	G
Inhibin, alpha	INHA	G
Inhibin, beta A	INHBA	G
Inhibin, beta B	INHBB	G
Inhibin, beta C		G
Insulin	INHBC INS	G
Insulin receptor	INSR	G
IP3 kinase	INSK	G
Kallman syndrome gene 1	KAL1	E.
Laminin 5, alpha 3	LAMA3	G
Laminin 5, beta 3		G
Laminin 7, beta 3	LAMB3	G
	LAMR1	G
Long QT-type 2 potassium channels	LQT2, KCNH2	T
Luteinizing hormone, beta chain	LHB	G
MAD (mothers against decapentaplegic,	MADH2	G
Drosophila) homologue 2	NALIT.	_
Methylmalonyl-CoA mutase Monoamine oxidase A	MUT	E
WICHOAITIINE OXIDASE A	MAOA	Ε

•		
Monoamine oxidase B	MAOB	_
Muscarinic receptor, M1	CHRM1	E
Muscarinic receptor, M2	CHRM2	N
· · · · · · · · · · · · · · · · · · ·		N
Muscarinic receptor, M3	CHRM3	N
Muscarinic receptor, M4	CHRM4	Ν
Muscarinic receptor, M5	CHRM5	Ν
NADPH-dependent cytochrome P450	POR	Ε
reductase		
Neuropeptide Y	NPY	N
Neuropeptide Y receptor Y1	NPY1R	Ν
Neuropeptide Y receptor Y2	NPY2R	Ν
Nitric oxide synthase 1, NOS1	NOS1	Ε
Nitric oxide synthase 2, NOS2	NOS2	E
Nitric oxide synthase 3, NOS3	NOS3	E
Oncogene ELK1	ELK1	G
Oncogene ELK2	ELK2	Ğ
Paired box homeotic gene 3	PAX3	G
Patched (Drosophila) homolog, PTCH	PTCH	·G
Potassium inwardly-rectifying channel J1	KCNJ1	N
Potassium inwardly-rectifying channel J11	KCNJ11	N
Potassium voltage-gated channel A1	KCNA1	N
Potassium voltage-gated channel E1	KCNE1	N
Potassium voltage-gated channel Q1	KCNQ1	N
Potassium voltage-gated channel Q2	KCNQ2	N
Potassium voltage-gated channel Q3	KCNQ3	
	PGR	N
Progesterone receptor (RU486 binding	rgk	G
receptor)	DOMO	
Proopiomelanocortin	POMC	N
Prostasin, PRSS8	PRSS8	E
Ribosomal protein S4, X-linked	RPS4X	Ε
RIGUI	RIGUI	G
Serotonin receptor, 5HT1A	HTR1A	Ν
Serotonin receptor, 5HT1B	HTR1B	Ν
Serotonin receptor, 5HT1C	HTR1C.	N
Serotonin receptor, 5HT1D	HTR1D	Ν
Serotonin receptor, 5HT1E	HTR1E	Ν
Serotonin receptor, 5HT1F	HTR1F	Ν
	HTR2A	Ν
Serotonin receptor, 5HT2B	HTR2B	Ν
Serotonin receptor, 5HT2C	HTR2C	Ν
Serotonin receptor, 5HT3	HTR3	Ν
Serotonin receptor, 5HT4	HTR4	Ν
Serotonin receptor, 5HT5	HTR5	Ν
Serotonin receptor, 5HT6	HTR6	N
Serotonin receptor, 5HT7	HTR7	N
Sodium channel, non-voltage gated 1, alpha	SCNN1A	N
Sodium channel, non-voltage gated 1, beta	SCNN1B	N
Sodium channel, non-voltage gated 1, gamma	SCNN1G	N
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Sodium channel, voltage gated, type V, alpha polypeptide	SCN5A	N
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	N
Solute carrier family 6 (GAMMA-AMINOBUTYRIC ACID transporter), member 1	SLC6A1	Т
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	T
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	Т
Sperm protamine P1	PRM1	G
Sperm protamine P2	PRM2	G
T-BOX 3	TBX3	G
Testis-specific protein Y	TSPY	Ğ
Tyrosine hydroxylase	TH	Ē
UDP-glucuronosyltransferase 1	ugt1d, UGT1	E
UDP-glucuronosyltransferase 2	UGT2	Ē
Vasoactive intestinal polypeptide	VIP	N
Vasoactive intestinal polypeptide receptor	VIPR	N
Zona pellucida glycoprotein 1	ZP1	G
Zona pellucida glycoprotein 2	ZP2	Ğ
Zona pellucida glycoprotein 3	ZP3	Ğ
Zona pellucida receptor tyrosine kinase	ZRK	G
	ZAN	G

- 526.A set of probes, said probes being antibodies or antibody fragments which interact with specific expressed proteins encoded by gene sequences of a group of genes, said probes being for detecting relevant variants (mutations and polymorphisms), e.g. nucleotide substitutions (missense, nonsense, splicing and regulatory), small deletions, small insertions, small insertion deletions, gross insertions, gross deletions, duplications, complex rearrangements and repeat variations in a target group of genes; characterised in that said group is a core group of genes consisting of substantially all of the genes defined in claim 525.
- 527.A set according to claim 525 or 526 in which a minority of said probes for listed genes are absent.
- 528.A set according to claim 525 or 526 in which a limited number of additional probes are present together with substantially all of the probes for the listed genes.
- 529.A set according to claim 525 or 526 in which a limited number of probes are replaced by probes for non-listed genes.
- 530.A set of probes for a core group of genes according to any of claims 525 to 529 in which each gene to be probed is substantially similar (greater than 85% homologous) in sequence to the respective member of the core list of genes.

- 531.A set according to any of claims 525 to 530 consisting of probes for members of a sub-group of the core group.
- 532.A set according to any preceding claim in which said probes are in the form of an array and are spatially arranged at known locations on a substrate.
- 533.A set according to any preceding claim wherein said probes are on a substrate which forms part of or consists of one or more chip plate(s), for use in a chip assay for detection of said gene variants.
- 534.A set according to any preceding claim in which said probes are mass, electrostatic or fluorescence tagged probes.
- 535.A set according to claim 532 or 533 in which said substrate is a semiconductor microchip.
- 536.A set according to any preceding claim for use in a biological assay for detection of said gene variants.
- A set according to any preceding claim for use in the measurement of 537. differential gene expression levels.
- 538. A medical device including a set according to any preceding claim for use in an assay for detection of said gene variants.
- 539.A medical device including a set according to any of claims 525 to 537 for use in an array for detection of differential gene expression levels.
- A method for use in assessing the genomic profile of a patient or individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 525) in a target group of genes by hybridising a nucleic acid-containing sample from said patient or individual to a set according to any of claims 525 and 527 to 537 and relating the probe hybridisation pattern to said variations.
- A method for use in assessing the the genomic profile of a patient or 541. individual, the method comprising testing for and detecting the presence or absence of DNA or RNA encoding the relevant structural variants (as defined in claim 526) in a target group of genes by interacting an expressed-proteincontaining sample from said patient or individual with a set of probes according to any of claims 526 to 537 and relating the probe interaction pattern to said variations.
- Use of a set or device according to any of claims 525 to 537 for the prognosis 542. and management of patients suffering from or at risk of developing sexual dysfunction.
- 543. Use of a set or device according to any of claims 525 to 537 for predicting likely therapeutic response and adverse events following therapeutic intervention.
- 544. Use of a set or device according to any of claims 525 to 537 for predicting likely therapeutic response and adverse events following the intake of a specific drug.
- Use of a set or device according to any of claims 525 to 537 for predicting likely patterns of symptom clusters (symptom profiles) in disease and the likelihood of subsequent, contingent, disease or symptoms.
- Use of a set or device according to any of claims 525 to 537 for general health 546. screening, occupational health purposes, healthcare planning on a population basis and other healthcare management utilisations.
- 547. Use of a set or device according to any of claims 525 to 537 for the development of new strategies of therapeutic intervention and in clinical trials.
- Use of a set or device according to any of claims 525 to 537 for construction 548.

- of and generation of algorithms for patient and healthcare management.
- 549. Use of a set or device according to any of claims 525 to 537 for modelling or assessing the impact of diseases or healthcare management strategies on individuals, groups, patient cohorts or populations
- 550. Use of a set or device according to any of claims 525 to 537 for modelling, assessing or exploring the theoretical impact of diseases and healthcare management strategies on individuals, groups, patient cohorts or populations.
- 551. Use of a set or device according to any of claims 525 to 537 for predicting optimum configuration/management of thereapeutic intervention.
- 552.A method according to claim 540 or 541 in which the identification of gene variants is indicative of a higher risk of developing sexual dysfunction for the patient or individual.
- 553. A method for generating a model to assess whether a patient or individual or population or group is or are likely to develop sexual dysfunction which method comprises:
- i) obtaining DNA or RNA or protein samples from patients or individuals diagnosed as suffering from sexual dysfunction;
- ii) obtaining DNA or RNA or protein samples from a control group of subjects diagnosed as not suffering from the sexual dysfunction;
- iii) analysing the samples obtained in i) and ii) to identify the polymorphic variations encoded in the core group of genes as defined in any of claims 525 to 531;
- iv) calculating the frequencies of these alleles in the samples from i) and ii);
- v) comparing the frequencies of these alleles in i) and ii);
- vi) performing a statistical analysis on the results from v) in order to generate a model for assessing the risk of developing sexual dysfunction.
- 554. A method for assessing whether a given subject will be at risk of developing symptoms, which comprises comparing said subject's genotype with a model generated by the method of claim 553.
- A method according to any of claims 540, 541, 553 and 554 wherein at least one step is computer-controlled.
- 556. An assay suitable for use in a method according to any of claims 540, 541, 553 and 554; said assay comprising means for determining the presence or absence of relevant polymorphic variants of the core group of genes as defined in any of claims 525 to 531 in a biological sample.
- 557. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing sexual dysfunction; said kit comprising:
 - i) means for testing for the presence or absence or DNA or RNA encoding relevant polymorphic variants of the core group of genes as defined in claim 525 or 527 to 531 in a sample of human DNA;
 - ii) reagents for use in the detection process
 - iii) readout indicating the probability of a patient or individual developing sexual dysfunction.
- 558. A formatted assay technique (kit) for use in assessing the risk of a patient or individual developing sexual dysfunction; said kit comprising:
 - i) means for testing for the presence or absence of proteins encoded by the core group of genes and/or relevant polymorphic variants of the core

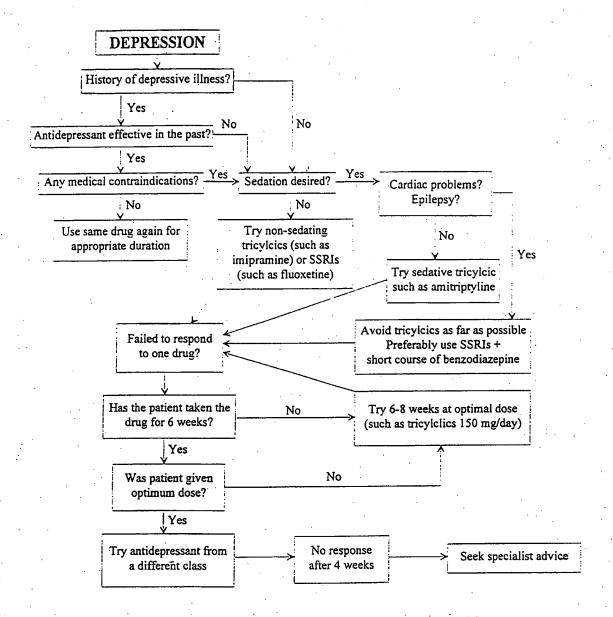
- group of genes as defined in any of claims 526 to 531 in an expressed-protein-containing human sample;
- ii) reagents for use in the detection process
- readout indicating the probability of a patient or individual developing sexual dysfunction.
- 559. A set of probes according to claim 525, wherein the probes are selected from the group consisting of oligonucleotides and polynucleotides.

SCHIZOPHRENIA

Standard oral neuroleptic Nonadherence is common. (eg chlorpromazine or haloperidol) Continue with oral therapy or Effective especially if patients do not at standsrd doses collaborate in their choice change to depot to assure of treatment Tolerated adherence to therapy Asses over at least 4 weeks ineffective Not tolerated Assess efficiency and Change to different class of oral tolerance with recognised neuroleptic at standard doses rating scales, eg BPRS, PANSS, Try 'atypical' drug or sulpiride if ESRS, LUNSERS Continue with oral therapy or Effective first drug poorly tolerated change to depot to assure Try 'atypical' if EPSE are severe or Tolerated adherence to therapy if negative symptoms predominate Assess over at least 4 weeks Avoid neuroleptic, polypharmacy Ineffective Not tolerated - oral + depot are rarely necessary Consider augmenting with lithium Consider early use of short term (if schizoaffective), benzodiazepines clonazepam if sedation is required Continue to reviwe need Effective in acute psychosis (to sedate) or carbamazepine (for regularly. Long term therapy agression or as a mood stabiliser) with benzodiazepines not Tolerated recommended Assess over at least 4 weeks Ineffective Not tolerated Consider increasing dose of neuroleptic Few data to support the use of high-May exceed BNF limited if Royal If measured improvement, dose neuorleptics. Do not exceed Effective College guidelines followed recommended dose for 'atypical' drugs document in notes and TPR/ECG, etc (See BNF) continue, ?with depot. Tolerated Review frequently. Assess over at least 4 weeks, but no longer than 3 months Ineffective Not tolerated Some support for the use of clozapine Change to clozapine plasma levels - aim for a pre-dose Effective Give dose of 400 mg daily+ If measured improvement, level of 350 mcg per litre continue at reduced dose Tolerated Assess over at least 6 months Ineffective Not tolerated Perform complete drug history Review diagnosis Consider withdrawing all (ineffective) drugs and give most effective drug previously

prescribed at lowest dose

DEPRESSION



CORRECTED VERSION**

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(57) Abstract

The present invention defines a DNA protein-binding assay useful for screening libraries of synthetic or biological compounds for their ability to bind DNA test sequences. The assay is versatile in that any number of test sequences can be tested by placing the test sequence adjacent to a defined protein-binding screening sequence. Binding of molecules to these test sequence changes the binding characteristics of the protein molecule to its cognate binding sequence. When such a molecule binds the test sequence the equilibrium of the DNA:protein complexes is disturbed, generating changes in the concentration of free DNA probe. Numerous exemplary target test sequences (SEQ ID NO:1 to SEQ ID NO:600) are set forth. The assay of the present invention is also useful to characterize the preferred binding sequences of any selected DNA-binding molecule.

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